FOUNDRY TRADE JOURNAL

EST. 1902

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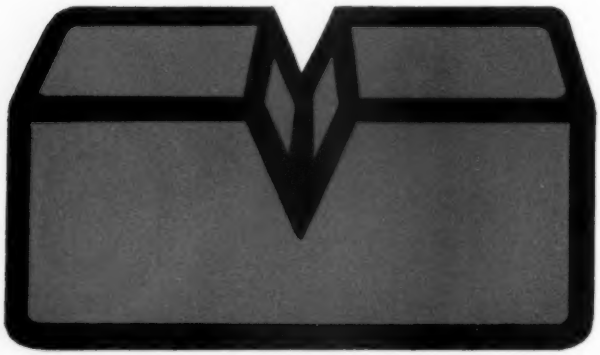

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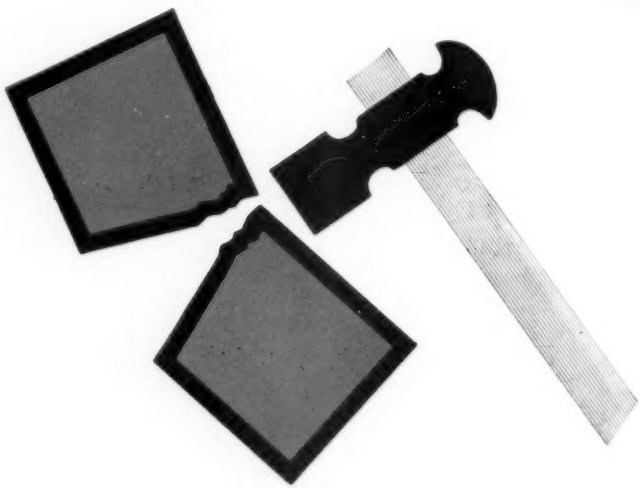

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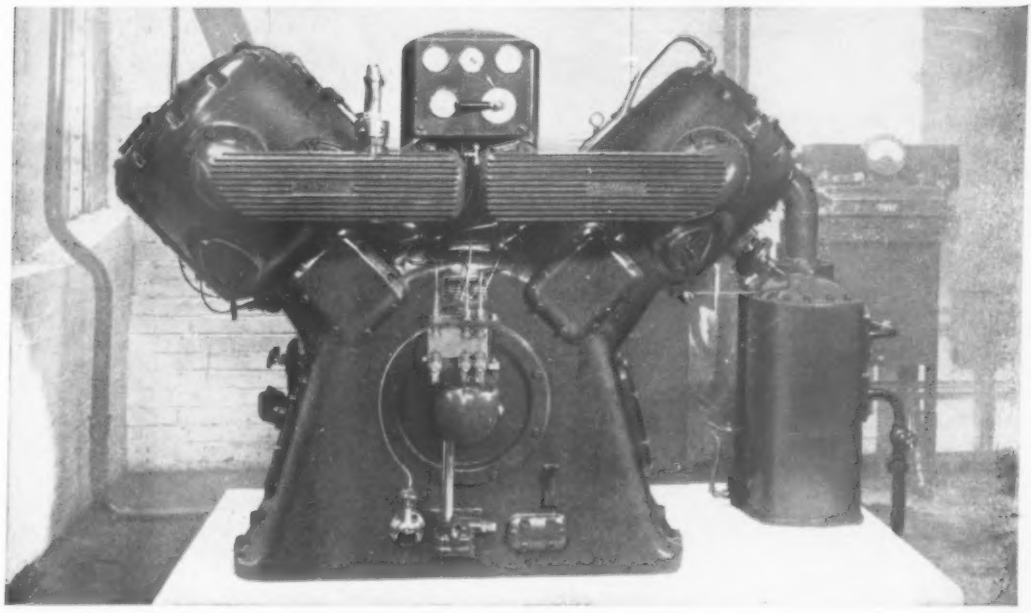

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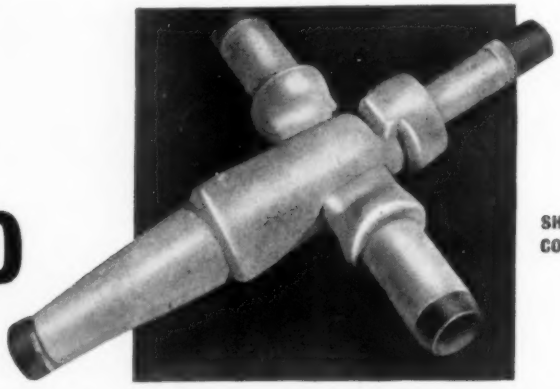

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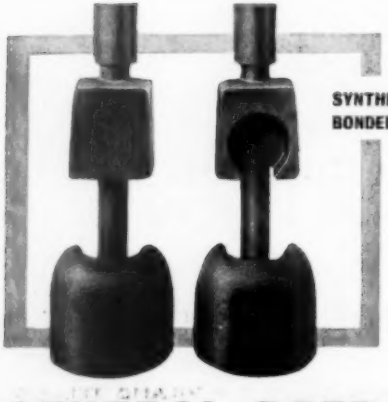

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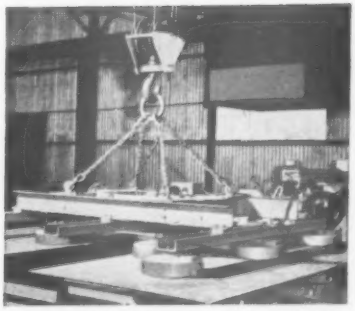
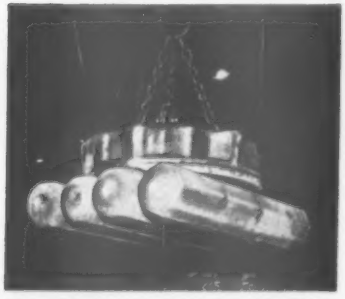


A group of lifting magnets at the Manor Works of Joseph Sankey & Sons handling plates for the magnet yoke of a 7000 MeV proton-synchrotron.

Lifting pig iron at Round Oak Steelworks Ltd.



Lifting four ingots at the works of Taylor Brothers & Co. Ltd., Trafford Park. The total lift is about 13,440 lbs.

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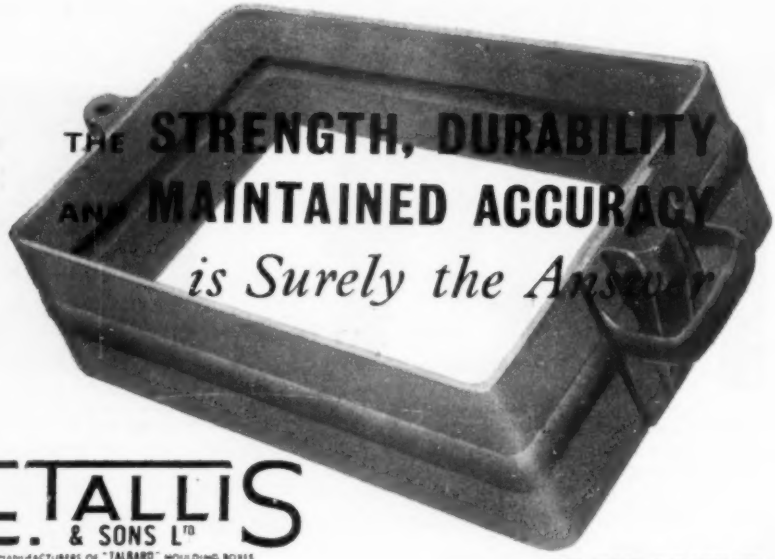

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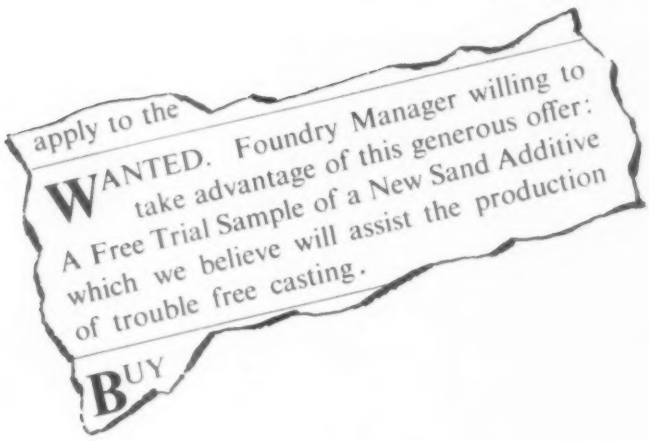
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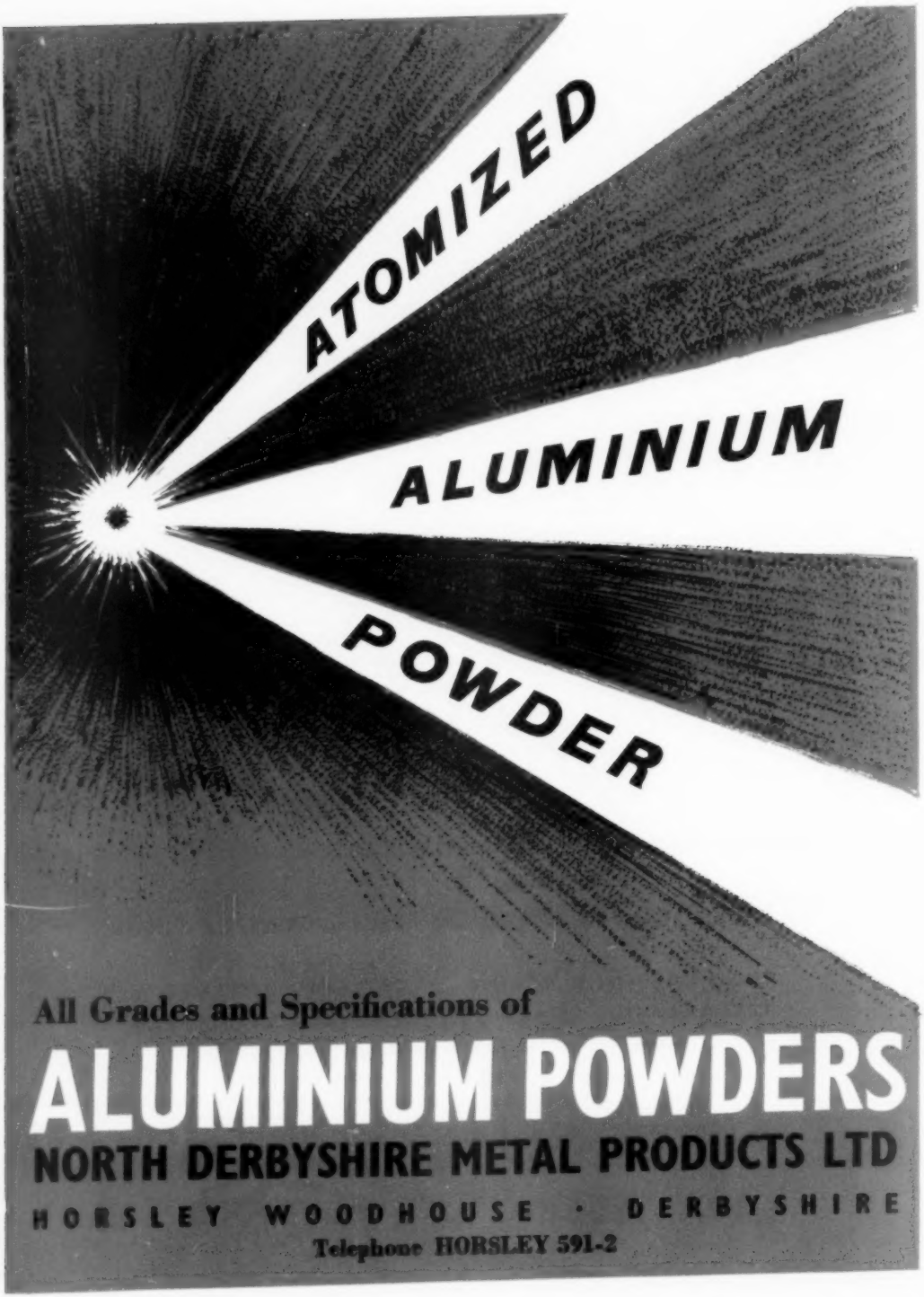
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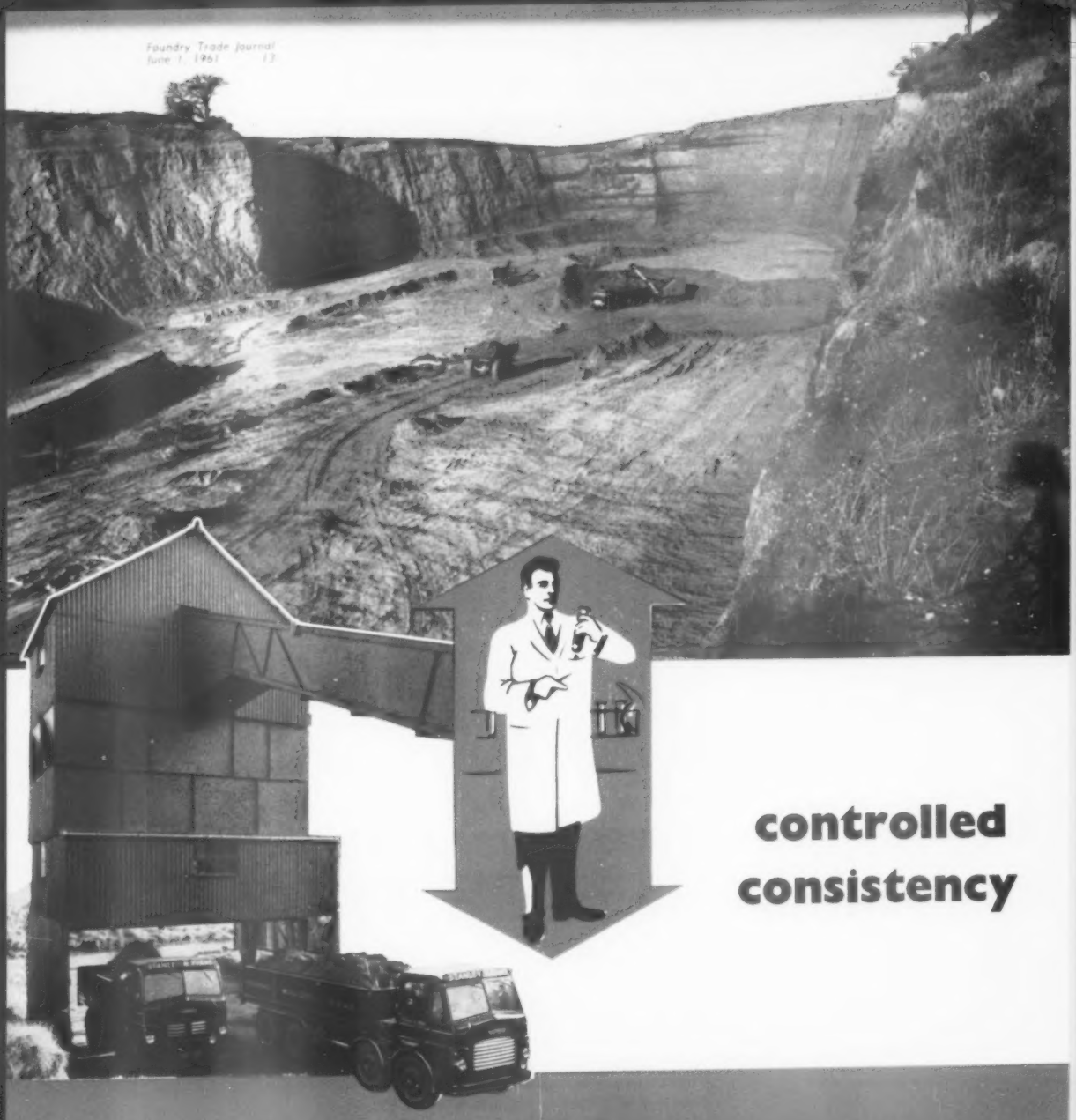

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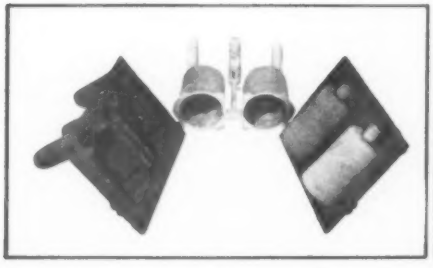

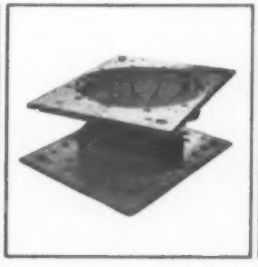

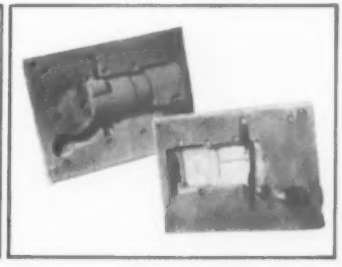

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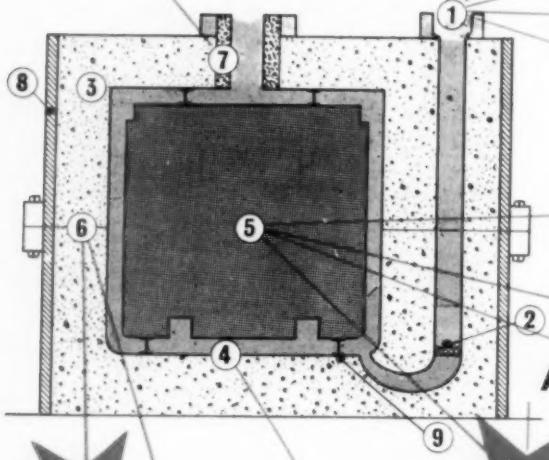

Key to Sectional Drawing of Mould

		Send for booklet No.
1	Metallurgical Control use of Fluxes	3
2	Clean Metal by using Ceramic Strainer Cores and Discs.	4
3	Coal Dust additional to Facing and Backing Sand	1
4	Silverskin Blackings, Plumbago and Mould Dressings.	1
5	Cores using Crulin and Crudol Core Binders (Oil Bonded, Air Setting Cereal or CO.2 Binders).	2
6	Moulds Parted with Beecro Silica Free Parting Powder or Beecrol Parting Liquid.	1
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8	Moulding Boxes supplied by B.F.U.	5
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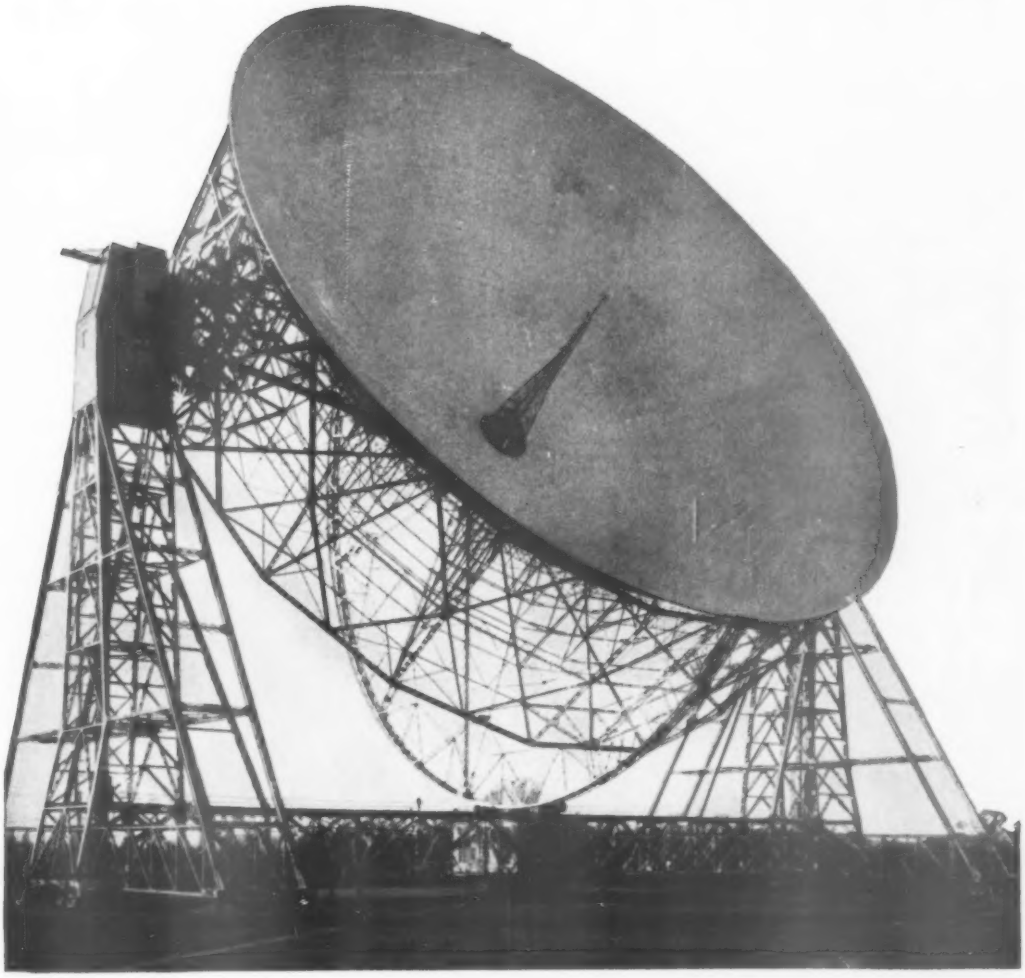

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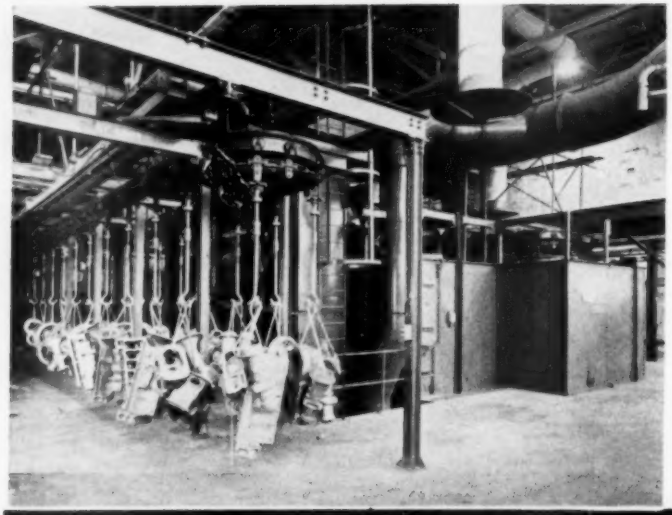
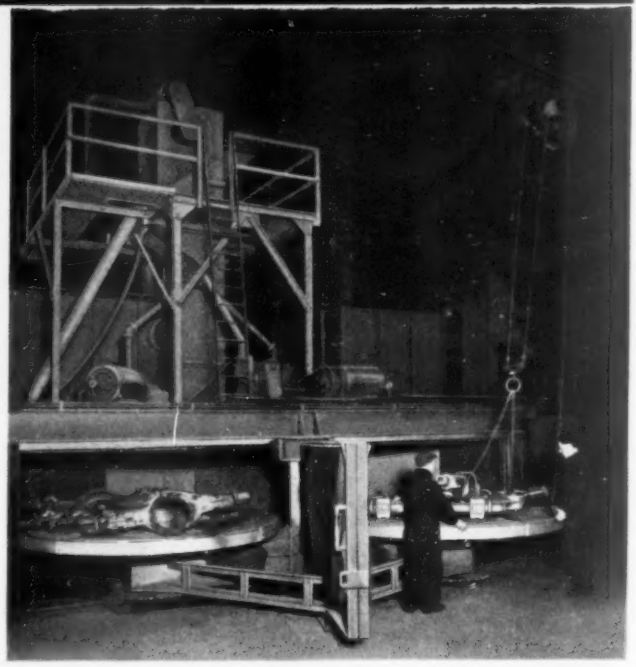


OVERHEAD MONORAIL CONVEYOR ABRASIVE CLEANING PLANTS

One of two Overhead Monorail Conveyor plants installed in the foundry at the Ford Motor Co. Ltd., Dagenham, for cleaning tractor and commercial components. The machine is equipped with six centrifugal blast units, which give complete cleaning coverage to the heavily loaded conveyor hangers passing through the cabinet.

DUAL TABLE WHEELABRATOR PLANTS

The machine illustrated has two 9 ft. diameter tables, and is installed in the steel foundry of the English Steel Corporation Ltd., Sheffield. In this instance, production has been doubled and the handling halved, compared with the cleaning method used previously.



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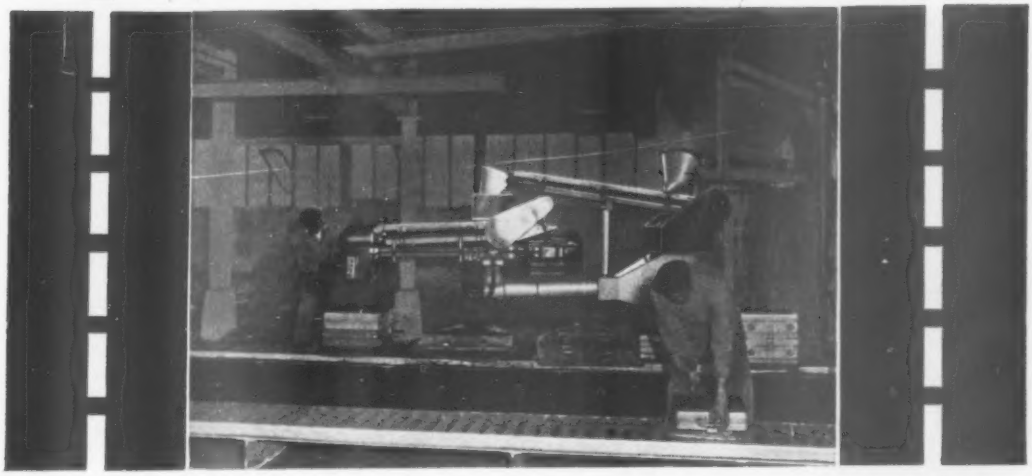

The above photograph, appearing by the kind permission of The Alliance Foundry Co. Ltd., of Luton, Beds., shows one of our Sand Projection Machines No. 6, which has been installed and is now operating in their Foundry.

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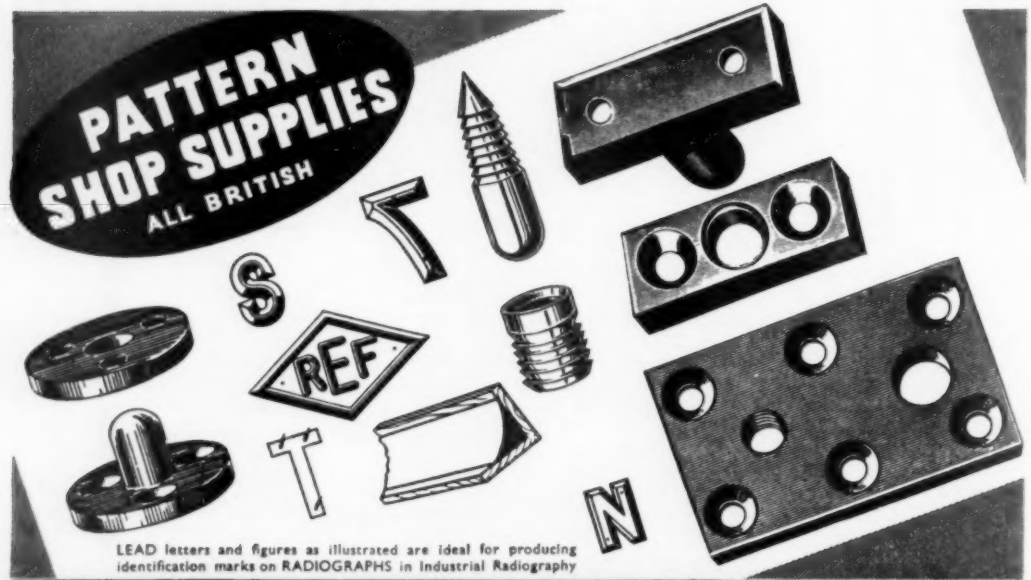

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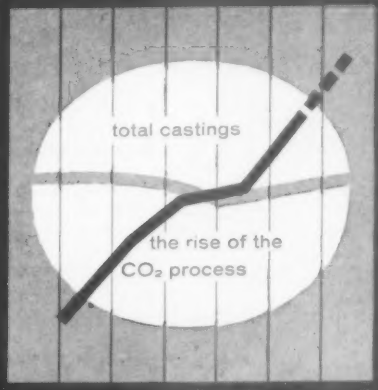

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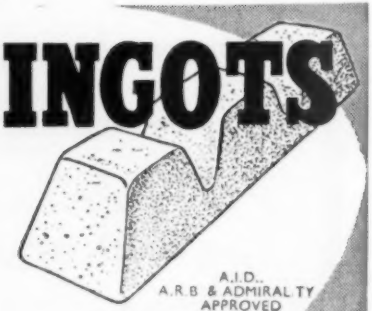

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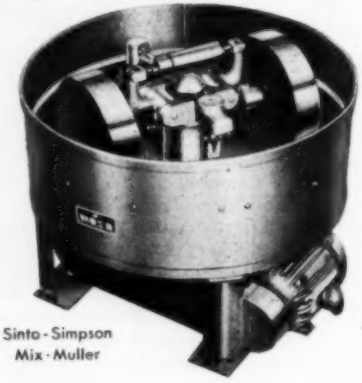

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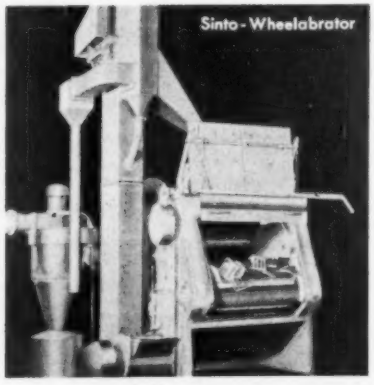

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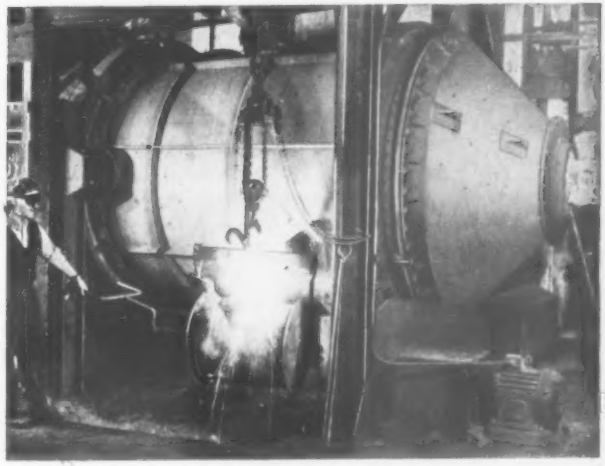

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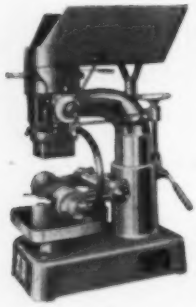

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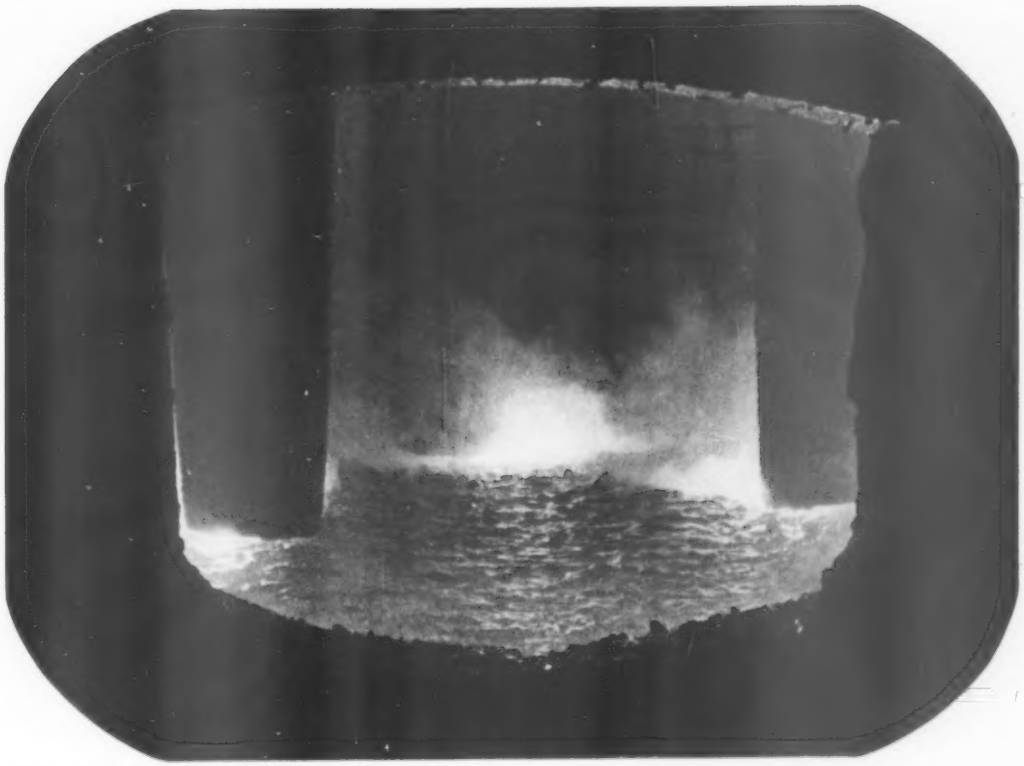

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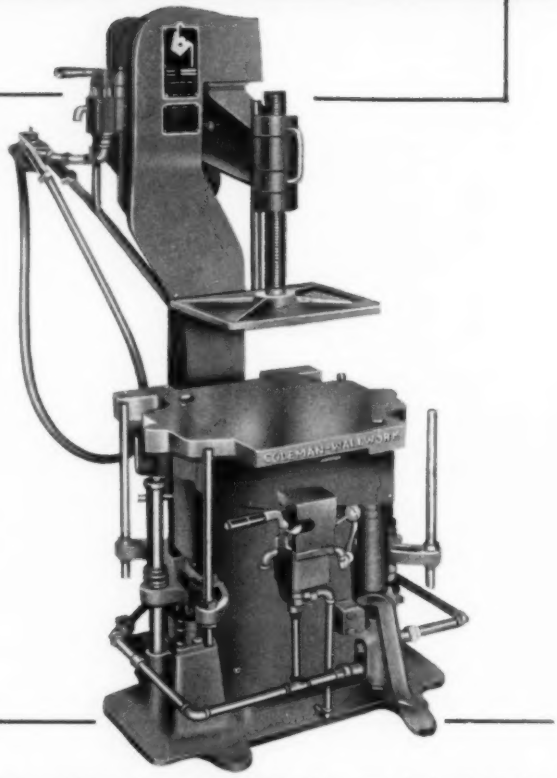

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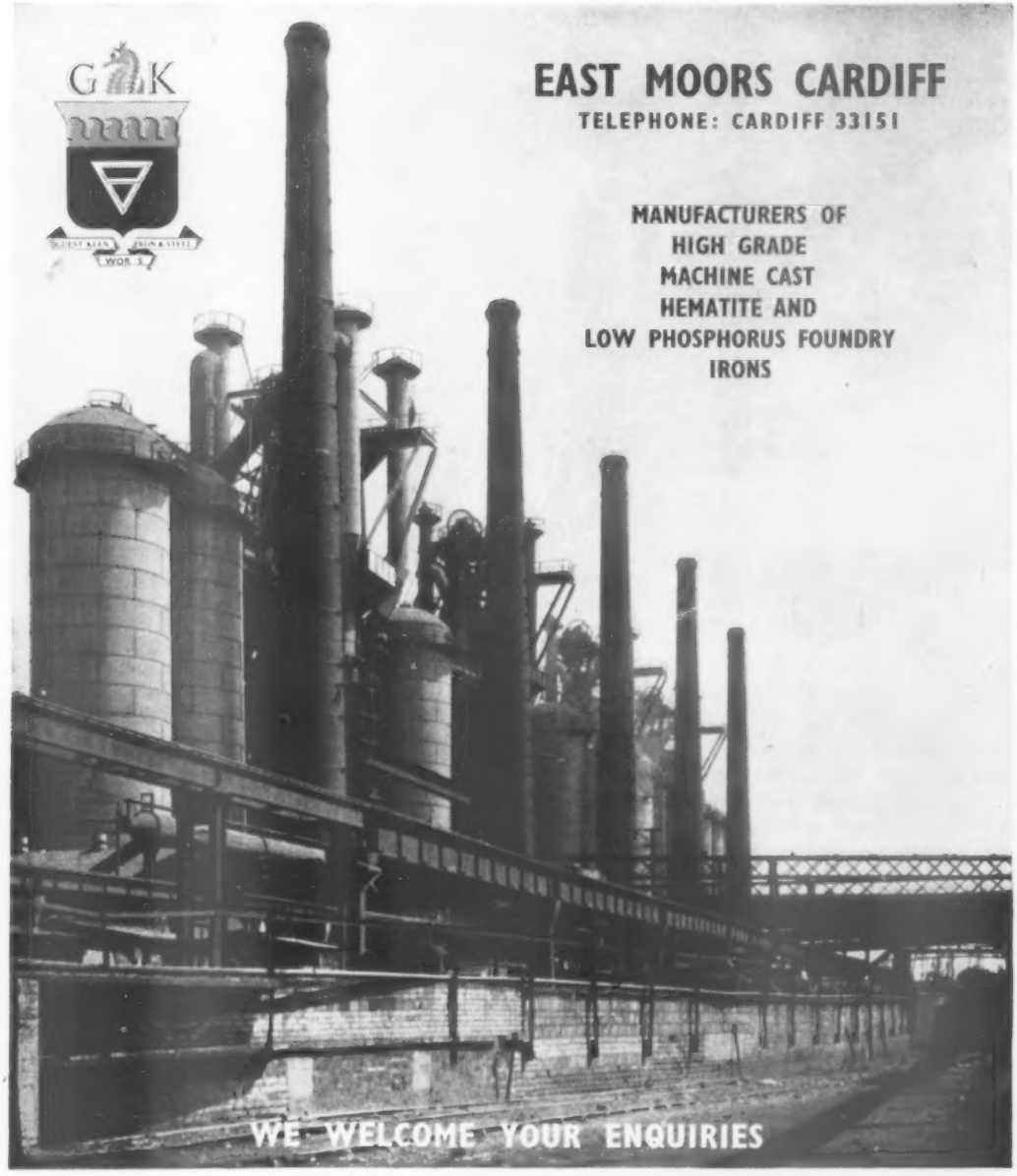

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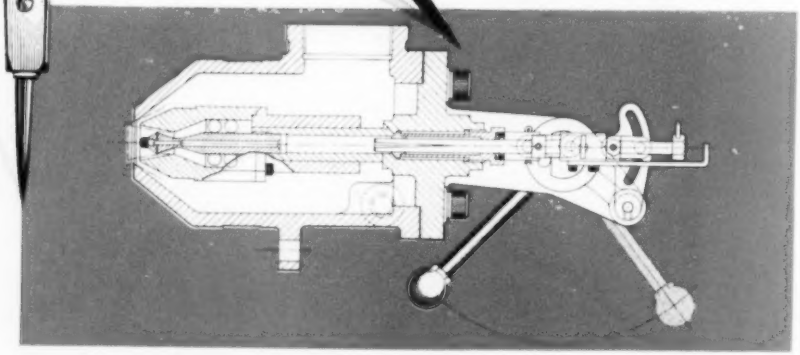

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Modern carving in Ardington Parish Church of pigs feeding on acorns. Photograph by Ruth Meyler & F. C. Sillar

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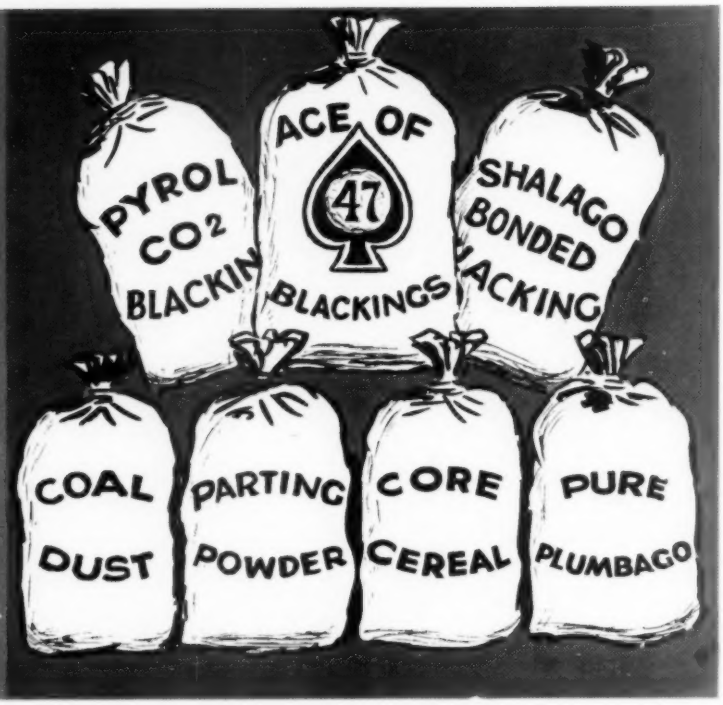

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ORGANISATION OF THE UK FOUNDRY INDUSTRY

The foundry industry of the United Kingdom is represented by the following organisations, many of whose proceedings are regularly reported in this JOURNAL:—

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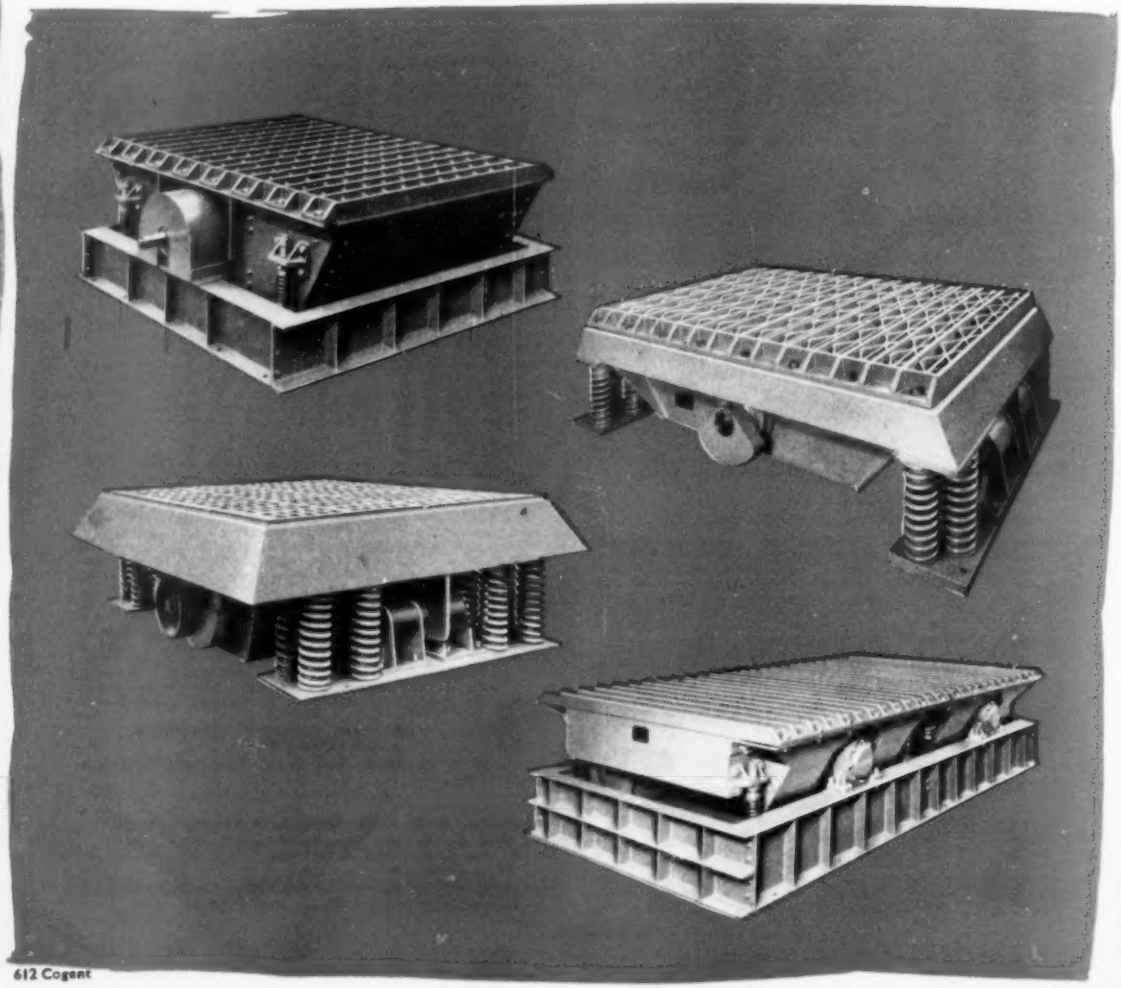

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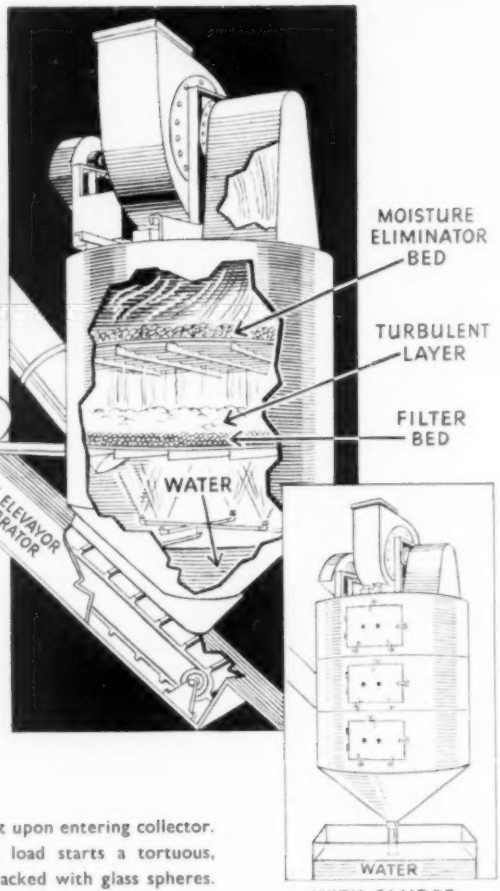
The AUGUST-NATIONAL HYDRO-FILTER



STOPS DUST 4 WAYS

1 Impingement on wetted surface of glass spheres.

2 Impingement on bubble surfaces and . . .

3 Entrapment within falling water droplets.

4 Impingement on wetted surface of collection area.

WITH SLUDGE SETTLING TANK

HERE'S HOW IT WORKS

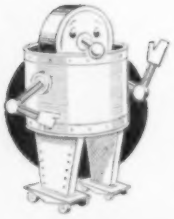
1 Large dust particles are thrown out upon entering collector.

2 The air with its remaining dust load starts a tortuous, deflective path through the bed packed with glass spheres. Dust is impinged at high velocity on wetted surfaces and flushed downward continuously.

3 Air is converted to bubbles in a pool of violently turbulent water and mist maintained above filter bed. Small dust particles are trapped in water droplets and are flushed downward.

4 Air approaches moisture eliminator bed through more mist and droplets. Moisture is removed by impingement on packing media and returned to the bottom of the collector.

5 Clean air is exhausted to atmosphere.



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FOUNDRY
TRADE JOURNAL

Vol. 110 June 1, 1961 No. 2321

Creditable Achievement

From the viewpoint of the ironfoundry industry, a most satisfactory statement has been made to the public by *The Times*. It discloses how during the last decade that industry in this country has increased its production, using a reduced number of men operating in fewer establishments. This achievement is epitomized by the fact that in 1949, the output per man/year was 23 tons, rising to 27·1 tons in 1955, and culminating in 1960 with 30·5 tons. This is indeed a remarkable and noteworthy advance and it would be interesting to see how it compares with the foundry productivity of other manufacturing countries. Concurrently with this development, there has been the reduction in the number of iron foundries; in 1949, there were 1,938; in 1955, 1,775, and last year, 1,488. The greatest decline in numbers has been amongst the very small jobbing shops, for last year the average annual output per iron foundry, at 2,600 tons per annum was over 50 per cent. higher than in 1949.

Whilst production has risen from 3,388,100 tons in 1949 to 3,967,000 last year, so too has the quality been enhanced proportionately and increasing quantities of iron castings are to-day being manufactured to exacting specifications. This applies equally to the "tied" foundries which are responsible for about 25 per cent. of the total output. No-one, so far as we know, has provided an acceptable definition of a tied foundry. Are the makers of goods such as domestic heating-appliances, lawnmowers and the like independent or tied? The French have a separate classification, "*sur album*," for goods which are illustrated and priced in trade literature.

The Times has printed an interesting table which shows the regional distribution of the ironfoundry industry, together with figures indicating the percentage change since 1949. Due possibly to the installation of an ingot-mould foundry, Wales which makes only 3 per cent. of the total production shows an increase of 20 per cent. Lancashire and the North West, which makes 11 per cent. of the total output has declined by 20 per cent., despite the colossal output of a North-west-coast ingot-mould foundry. Thus increased output in one direction must have been more than neutralized by reduced activity in the textile-component and chemical-plant foundries. The most impressive figures are shown by the West Midlands area which is responsible for 28 per cent. of the national output, but which in the last decade has increased its share by 16 per cent., due no doubt to expansion of the automobile industry. We deem the progress now reported reflects great credit on the ironfoundry industry and their suppliers of plant and materials, whilst the great technical help given by the British Cast Iron Research Association must also be stressed. Moreover, if it were not for the statistical department of the Council of Ironfoundry Associations, who no doubt provided basic information for the survey referred to, the industry would still be left guessing as to how it was progressing.

Correspondence

SOHO FOUNDRY 1796-1956

To the Editor of the FOUNDRY TRADE JOURNAL

SIR,—Mr. A. J. Shore's delightful article on: "Soho Foundry 1796-1956, written 'in his own direct style' refers to the nice line of patter about the doings of James Watt . . . for the most part completely inaccurate," and I am tempted to add a further such item of much later date.

During the Soviet first five-year plan I was at Leningrad Metal Works advising on the licensee manufacture of large steam turbines. On my arrival I was conducted through the works and when in due course I arrived at the coreshop the use of horse manure for coresand binding caught my eye. The "master" in charge of the coreshop asked me whether we used this "binder" in our British foundries. I replied that although the incidence of horseless carriages had considerably diminished the sources of supply, we had formerly used it abundantly.

I then went on to "explain" that its use had been introduced—inadvertently—by James Watt who had been sorely troubled in the binding of the cores for his first steam-engine casting and found on his return after a short interval that the new materials he had previously prepared had been "fouled" meantime by horse droppings. And that, in disgust, he gave instructions to "proceed" never the less. Thus, he found a complete solution to his problem.

This apocryphal story—in Mr. Shore's best vein—was duly put over by my completely non-technical interpreter who considerably "improved" upon it by adding on his own account that from this historic incident James Watt introduced the term "horsepower." Yours, etc.,

A. C. ANNIS.

327, Princess Road,
Fallowfield, Manchester, 14.
May 27, 1961.

French Foundrymen's Association

The *Association Technique de Fonderie* (French foundrymen's association) announces that the 34th Congress will be held in Paris on November 13 and 14. The first day will be devoted to technical sessions followed in the evening by the Congress dinner. The morning of the second day (Tuesday) will also be taken up with technical sessions, whilst for the afternoon a series of works visits have been arranged.

Thirteen technical papers are to be presented of which two are of a general character and cover accident prevention and quality control; 10 are designed to the requirements of the various sections of the foundry industry, and the 13th is from Dr. Plesinger, of Brno, and will deal with the making of synthetic pig-iron in the induction furnace.

This 34th Congress is also the golden jubilee of the *Association* and two lectures will recount its history since its inception and indicate the lines for its future development. The lectures are to be by two past-presidents, Mr. A. Brizon and Mr. J. Lainé. Those from this country wishing to participate should write to the secretary—Association Technique de Fonderie, 2 rue de Bassano, Paris XVI.

THOMAS WRAGG & SONS (SHEFFIELD), LIMITED, fireclay refractory manufacturers, of Sheffield—A final dividend of 10 per cent. makes 15 per cent. for the year ended March 31, 1961. Net balance is £84,724 (£83,710) after tax of £90,643 (£80,727).

Further Education Conference

"The Commonwealth Technical Training Week (May 29 to June 3) will give the technical colleges a splendid opportunity of strengthening their links with industry, the schools, parents and young people," said Mr. A. A. Part, Deputy Secretary, Ministry of Education, addressing the Annual Conference of the East Anglia Regional Advisory Council for Further Education, at Clacton. A great deal, he said, had been done during the last five years, and the numbers taking "sandwich" courses had risen from 1,400 to over 10,000. The numbers taking part-time day courses stood at well over half a million and it was now known that the enrolments in these courses last September showed an increase of 35,000 over the previous year. Altogether there were now 2,000,000 students in further education. It was hoped that a good number of new courses would be able to start this September.

"Commonwealth Technical Training Week," continued Mr. Part, "comes at a time when the first of the exceptionally large age-groups resulting from the post-war bulge in the birth-rate will be leaving school, and when, therefore, industry and the education service alike are faced with a special challenge. To assist their efforts the Ministry has circulated widely a pamphlet and a wall-chart explaining the system of technical education." He went on to say that better links with industry and the schools would also help to improve the quality of technical education, and this was one of the main objects of the White Paper on "Better Opportunities in Technical Education" published last January. "We want to make it clear to everyone," concluded Mr. Part, "that there are opportunities available at every level from the 15-year-old school-leaver to the post-graduate student and there is a road right to the top for anyone with the necessary ability and perseverance."

International Testing Committee

A meeting of the working group of the International Committee on Methods of Testing Cast Iron was held in London on April 27 and 28 at the offices of the Council of Ironfoundry Associations in Pall Mall under the chairmanship of Dr. H. T. Angus (British Cast Iron Research Association). The following other representatives from various European countries attended: Dr. A. B. Everest (Great Britain); Mr. J. Fauquembergue, Mr. E. Guenzi and Mr. J. C. Margerie (France); Mr. E. O. Lissell (Sweden); Professor A. de Sy (Belgium); Dr. J. Wozniacki (Poland); Mr. G. Földes (Switzerland); Mr. W. Standke (Germany) and Mr. A. Bordes (Netherlands).

The Committee considered drafts for an international graphite classification and for an impact test for grey cast iron. These drafts as modified are to be submitted to the main International Committee of Foundry Technical Associations at the International Conference in Vienna this month. The formation of a European sub-committee to consider the shock testing of malleable cast iron was also noted. The first meeting of this sub-committee is also to take place in Vienna.

On the afternoon of April 28 at the invitation of the Ford Motor Company, Limited, members of the working group visited the Thames foundry at Dagenham.

WHESSOE, LIMITED—Mr. John H. Lord has joined the board. He is a director of Dunlop Rubber Company, Limited, and G. & J. Weir (Holdings) Limited.

Austrian Foundry Industry . . .

. . . Survey of Countrywide Activities

By V. C. Faulkner, F.R.S.A., Hon. M.I.B.F.

As a prelude to the International Foundry Congress to be held in Vienna from June 18 to 24, the JOURNAL'S Editorial director has visited a cross-section of foundries in Austria so that foundrymen taking part in the Congress may have an insight into the type of foundries they will see and foundry practice carried on. What follow are brief accounts of the layout, buildings and plant of a number of typical installations.

Waagner-Biro AG, Vienna

The foundry of Waagner-Biro AG, at Genochplatzi, Wien XXII, was the first one to be visited during the tour. It is located in a southern suburb of Vienna, across the Reichsbruche, spanning the Danube. The foundry is directed by Dipl. Ing. Krammel, president of the Austrian Foundry Technical Association—the organizing body for the forthcoming International Foundry Congress. The concern is old established and produces both iron and steel castings. It employs about 500 people and the steel foundry is at least twice as big as the section devoted to iron. The foundry is serviced by a branch railway which runs into the raw-material stockyard where a mobile magnet crane handles the pig-iron and scrap.

Iron Foundry

In the iron foundry, metal is melted in a cupola plant consisting of four 5 ton per hr. furnaces which are mechanically charged by both drop-bottom buckets and an inclined-plane elevator. This plant is located at one end of a very large shop, which also houses the much bigger steel-melting section. It is serviced by 32 cranes, the most powerful of which is capable of handling loads of 25 tons. The largest castings made in the iron foundry weigh up to 30 tons each. Coke for the furnaces comes from Linz and is made from imported coal as the indigenous coal is of the non-coking variety.

Steel Foundry

The major melting plant in the company's large

FIG. 1.—*Aerial view of the works of Gebr. Grundmann, showing on the left-centre the swimming-pool in the spacious company grounds.*

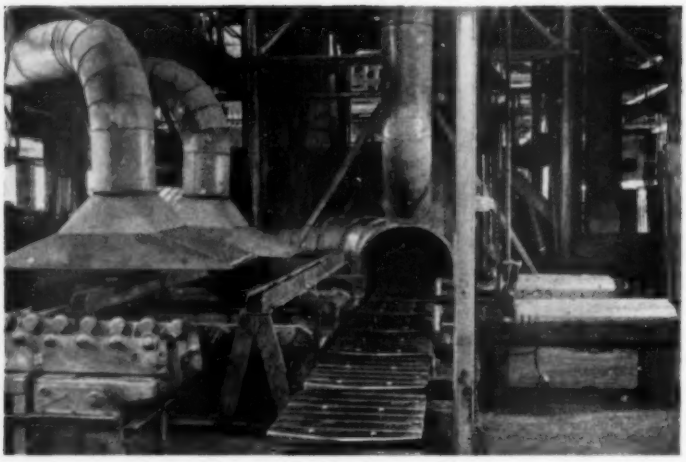


FIG. 2.—*Knockout at the Grundmann foundry showing the extensive fume ducting over the pallet-conveyor track and the rams for pushing the boxes on to the knockout.*

steel foundry consists of two electric-arc furnaces —one a Fiat and the other a Siemens. Oxygen blowing is normally practised, but despite this, the consumption of graphite electrodes is kept at 13 lb. per ton. Both furnaces have swinging roofs. As the foundry produces a number of special steels in addition to plain carbon steel, two 1-ton capacity high-frequency furnaces are installed. Moulding here is carried out to a large extent by hand and to the writer the moulders he saw gave the impression of being highly-skilled craftsmen. Moulds are coated with zirconia paint. Hand moulding is supplemented by a battery of jar/ram/squeeze moulding machines, the most modern being a jolt/ram/turnover pattern-draw machine by Kunkler-Wagner.

Two types of sand are used, one being synthetic sand (silica sand bonded with bentonite), and the other a green-coloured sand imported from Czechoslovakia. The CO_2 Process is in evidence for producing a certain amount of small castings. Sand is prepared in a central plant which fills portable hoppers which are carried and suspended above the working places; three trucks are available for aiding internal transport. In this steel foundry, quite large quantities of castings are produced for the railways and heavy pump-bodies, in addition to servicing the general-engineering industries.

Other Departments

The company has a good technical control service which is headed by Dr. Horak. In his depart-

FIG. 3.—*Moulds are automatically weighted by blocks suspended from a monorail running over the mould conveyor. (Grundmann foundry.)*

ment, which has a staff of 15 people, the routine testing of raw materials, especially sand, is undertaken, and the department is also responsible for X-ray and gamma-ray testing and supersonic investigations. The company has its own pattern-shop which is housed in a separate building from the main works. Installed in this section are the usual bandsaws, lathes, etc., but what is really required in the writer's view is a modern milling machine. Mainly the shop makes wooden patterns, but facilities are available for the provision of metal patterns. Experiments have been made with plastic patterns and developments in this direction are hoped for.

The company operates a first-aid post and ample bathing facilities are provided for its employees. On the social side, the company has its own football team, the ground being attached to the works. A small canteen is operated mainly for the benefit of unmarried employees and it is interesting to note that quite a number of the workmen run their own private cars.

M. Schmid & Sons, Wilhelmsburg

M. Schmid and Sons, was founded by Count M. Schmid in 1871. The general manager of the foundry is Dr. Sigut, honorary secretary of the International Congress. In the early days of its existence, the company manufactured small arms and later agricultural machinery. To-day, it specializes in the manufacture of electrically-melted grey pig-iron, both for the company's own use and for sale. In addition, both blackheart and whiteheart malleable iron is produced, together with steel castings, the latter meeting all the standards imposed by the Austrian authorities. The company employs about 600 workpeople. It is impossible to state how the labour is divided between grey iron and malleable, because the same employees are engaged on both productions depending whether they are working on the morning or afternoon shifts. The works produce pianoforte frames, and supply castings to the electrical, textile, railways, agricultural, radio, brewery and industrial engineering concerns.

The company's patternshops, which employ about 24 people, are being reorganized at the moment and are to be housed in a new shop. The laboratory services of the firm give the impression of being particularly efficient. In addition to the usual mechanical testing of metals, there is a complete sand-testing department. To the writer, there appeared to be something quite novel for the rapid ascertainment of the silicon content. The laboratory is connected by a pneumatic tube system to the steel furnace stage, where steel samples are despatched and analytical reports returned within a matter of minutes.

Raw materials for the furnaces are received by a private railway siding and are handled by a magnet crane. This serves two 8-ton per hr. cold-blast cupolas which are provided with oil-fired receivers. Adjacent to these are two 3-ton per hr. low-frequency Brown Boveri electric induction furnaces, which quite often work in duplex with the cupolas. At the time of the writer's visit, ordinary carbon steel was being produced for the steel foundry, the charge for the furnaces consisting of light steel-sheet scrap which was fed directly from an overhead crane with a magnet attachment.

Plant and Equipment

In the company's moulding section, there are 24 moulding machines by Zimmerman and one Vogel and Schemann. A centrifugal sand plant feeds the machines through the usual overhead belt conveyor, which ploughs off to the various machines. A workman is employed all the time on this band conveyor to adjust the ploughs. At the end of the line, there is a drop pipe for overspill sand and this leads to a conveyor which takes the spilled sand underground beneath the moulding machines. Moulding boxes are removed from the machine area on wheeled plates which replace the usual roller conveyors. Metal is hand shanked from the receivers.

Other Sections

The fettling shop is much the same as seen in UK foundries, but dust-removal systems employed

FIG. 4.—*General view of the heavy-casting bay at the Voith foundry, showing, in the background, an overhead crane holding a mould top-part in position prior to closing.*

FIG. 5.—*Core for a water-turbine casting being set in position in a pit in the foundry floor of the Voith works.*

are not quite so advanced. The shotblast plant employed is of German manufacture and of the turntable type. The company's coreshop is of very considerable dimensions and the battery of drying stoves are of the batch type and are oil fired. The quality of the cores produced is of such that they are given no coating.

It would appear that for blackheart castings, no packing with an inert material is used, but a straight heat-treatment. For whiteheart, however, the castings are carefully packed in Swedish hematite ore in chrome-iron alloy cast iron cans carrying a modicum of nickel. These have a life of 14 to 16 charges and are made on the premises. The annealing furnaces installed are of the continuous type and are oil fired. A feature of this foundry, which is said to be unique in Austria, is the "galvanizing" of a range of castings by dipping them in liquid zinc. Castings processed in this way have an excellent appearance.

Branch Works

Twenty kilometres from the main foundry is a very interesting branch works which will probably be visited by foundrymen in the post-Congress tour in June. These works are located at Ybbs. A 5-ton capacity modern electric-arc furnace is installed here for melting steel. The liquid steel is taken up to the top of a very high shop where it is fed by a heated tundish to feed a continuous casting machine, which produces 3-in. sq. billets at the rate of 100 in. per min. The billets in the normal way go to Vienna for re-rolling into profile sections, but it is interesting to note that modest orders are being received from Great Britain, and these are sent by barges on the Danube and the Rhine to the North Sea ports.

Acknowledgment

The writer is deeply indebted to Dr. Zigut, not only for chaperoning him through the company's two works, but for many courtesies extended to him throughout his tour of Austrian foundries.

Osterreichisch-Alpin-Montan Gesellschaftwerk Traisen

The works of Osterreichisch-Alpin-Montan are semi-nationalized, and are of considerable importance as they employ no fewer than 1,350 workpeople. The company manufactures malleable-iron tube fittings, steel castings and ingots for re-rolling.

Malleable Foundry

The malleable foundry is of post-war construction and has been mechanized by Badische Maschinenfabrik on much the same lines as two foundries in England. No "teething troubles" were experienced and it is obvious that the plant is giving an excellent production. Metal is provided by two 5-ton per hr. cold-blast cupolas, both having oil-fired receivers. Distribution of the metal is by monorail-suspended ladles. Cores are made on Hansberg coreshooters, the tables of which are furnished with CO_2 gas for the hardening of the cores. Five of these machines are installed in the coreshop and these are supplemented by a further half-a-dozen or so of the same machines making ordinary oil-sand cores. During the tour of the foundry, the writer's attention was drawn to an automatic machine which machines the two faces of elbow castings simultaneously, thus giving a better finish than when the operation is carried out by hand.

The foundry is essentially automatic—the requisite amount of sand is delivered to the jar/ramming machines and the two half-moulds are cored up by hand, but are closed automatically. They then pass on to a platform conveyor where weights automatically drop on to the moulds and after casting, are raised and again function at the beginning of the conveyor. The moulds pass through a long cooling chamber to the knockout which was not inspected. The castings, however, pass to the annealing shop where the tubs are filled, layer by layer, with castings and hematite ore. Although the production is supposed to be blackheart, hematite ore coming from Sweden is used. The furnace used for annealing is of the batch type and is fired by town's gas, the cans being charged through the roof.

A slowly-moving band-type conveyor takes the castings from the fettling department to the annealing shop and girl labour is employed to sort out the castings into their various types. They also place the sprues into appropriate bins for return to the cupola.

The steel foundry is supplied with a large battery of electric furnaces ranging from 1- to 10-ton

capacity. In the company's steel foundry, about 350 tons of steel castings are produced monthly, the heaviest being about 8 tons. In addition, 1,600 tons of ingot steel is despatched every month to Donawitz for processing in an associated works. The foundry is in the heart of the country at Traisen and is unquestionably amongst the most modern in Europe.

Austria Vereinigte Emaillierwerke AG, Vienna

The address of this firm is Haidequer Strasse, Wien XI. This is stressed for the benefit of visitors who might use their own cars for the works visits, as the main office, quite a few miles away, appeared on the semi-official list issued for the Congress. In general this foundry is a good example of stove-grate shopworking under modern conditions. The general scheme is that a row of 27 moulding machines, placed along one wall of the length of the shop, is supplied with sand from a central sand-preparation plant. The main conveyor over the machines is a 20-in. wide belt with distributing ploughs located above each machine. To ensure proper distribution, a man is stationed alongside the belt. Beneath the moulding machines are gratings for spilled sand which is returned to the sand plant by an underground conveyor. At right angles to each machine are lines of roller conveyors which terminate at, or very near to, a series of knockouts. Again, there is a direct underground belt conveyor feeding the main sand plant (by Badische Maschinenfabrik). Metal is hand shanked to the moulds, some of which are stacked four or five high. Whilst the installation of a monorail conveyor would save much strenuous work, there seemed to be some doubt in the mind of the manager as to whether it would give that flexibility of pouring to be associated with hand shanking.

A railway siding serves the raw-material stockyard. Melting is carried out in one of a pair of hot-blast cupolas using the Hilden blast-heating system, and turning out 2½ tons of metal per hour. The cupolas are furnished with oil-fired receivers which are in use during the first few hours of working.

The works employ about 150 people and the works include the foundry, fettling section, enamel shop and press shop and an assembly department. Whenever possible, piecework is in operation. In the fettling shop, equipped with modern rotary-table shotblast machines and double-stand and swing-frame grinders, great attention has been paid to the elimination of dust, but not to the extent which is in evidence in the UK. A high proportion of female labour is employed in this department.

Enamelling Shop

The enamelling department of the works is highly mechanized and processes about 50 tons or more of castings per week, using only eight people. A system of pendulum-type conveyors carries the fettled castings to the spray booths, then through drying ovens which are fed with warm air. If there is a cover coat to be applied to the castings, the same conveyors bring and take them away. The enamels used in this shop are manufactured by an associated company which also undertakes enamelling. Four batch-type electrically-heated enamelling stoves are installed which use a cycle of 20 min. firing. For transfer of the castings from one shop to another, extensive use is made of fork-lift trucks and no goods are allowed to be put on the floor.

Other Departments

At the side of the enamelling shop is the firm's press shop, the two largest presses used being manufactured by the Belgian firm, Raskin. Components from both this shop and the enamelling shop are fed systematically into the assembly department where the use of a slowly-moving conveyor enables women labour to assemble cookers and other appliances made by the firm. The firm has very large storage capacity as the trade, which is national, comes to a peak in the autumn and early winter. In the summer, therefore, the departments work for stock.

Good washing facilities are available for all the employees and there is a first-aid post and a canteen where workmen can buy a substantial luncheon for 1s. 2d.

The writer is indebted to Mr. Fugger for his help in accumulating these facts though unfortunately collection of information was restricted by language difficulties.

FIG. 6.—*Double teeming taking place in the pouring of a water turbine. (Voith foundry.)*

FIG. 7.—*Pit mould at the Voith works for a base-plate for paper-making machinery.*

Vereinigte Wiener Metallwerke AG, Vienna

The foundry of Vereinigte Wiener Metallwerke AG is located at Wohllesbengasse 9, Wien, IV, a very pleasant suburb of Vienna. It confines itself entirely to the manufacture of aluminium castings and employs some 150 workpeople, including girl labour in the coreshop. The foundry produces every week about 10 tons of castings made to 15 different specifications, the largest casting made weighing 10 cwt. Metal is melted in a battery of 10 crucible furnaces which use Morgan crucibles which give very good results and a life of 350 charges was reported. In addition to the crucible furnaces, there are four 5-cwt. capacity low-frequency furnaces and a 16-cwt. capacity gas-fired tilting furnace.

The company operates its own patternshop which employs from 10 to 12 patternmakers. It is equipped with the usual equipment with the addition of a very small miller of new design. Most of the patterns made are of wood, but the provision of metal ones is increasing.

Sand is prepared in a central plant and distributed to a battery of 21 jar/squeeze Zimmermar moulding machines from an overhead belt conveyor which fills hoppers immediately above the machines. Both sand and die-castings are made, the latter process tending to increase at the expense of sand-cast production. The main bay of the foundry is spanned by four overhead travelling cranes. A wide variety of monobloc castings are being made and at the present time, orders are in hand for Egypt and Poland. The inspection department is obviously well organized for ascertaining both dimensional accuracy and water-tightness.

The foundry gives the visitor an excellent impression of sound management. It is essentially neat and the progress of work is routed logically. In one corner, for example, there was a heap of the day's waste—about four castings.

The writer is grateful to Mr. Csernohorszky for a most cordial and courteous reception.

Gebr. Grundmann, Ohg., Linz

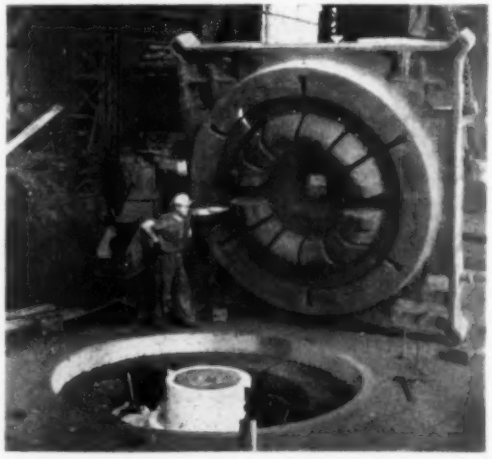
The works of Gebr. Grundmann in the north of the city were, until five years ago, under Russian occupation. This means that they were actually occupied and managed by the Russians. Five years is but a short time to re-organize and modernize, but this firm, which was founded in 1855 and still operates as a private partnership, has been thoroughly modernized. It now employs about 2,900 workpeople. Its best known production is the manufacture of locks and keys for both doors and furniture and it exports all over the world, especially to the lesser-developed countries such as the Sudan and the Congo, the latter trade having diminished considerably since the Belgians handed over control.

The management of the works is very progressive in so far as its social services are concerned. As can be seen from the aerial photograph, Fig. 1, in front of the works there is a park in which there are a football pitch, tennis courts, children's paddling pool, and a café. Moreover, the firm is constantly, at its own expense, building exceedingly nice houses for its workmen, every house having its own bathroom and cellar. In the actual works, there are a first aid station and modern bathing facilities.

Foundries

In the malleable iron foundry, about 450 people are employed, whilst a further 100 work in the

FIG. 8.—*Mould for a turbine-housing casting shown prior to closing at the Voith foundry.*



firm's aluminium foundry. The firm makes its own metal patterns and employs 24 patternmakers, of which only three are employed making wooden patterns.

Raw materials for the iron foundry are received by road. Melting is carried out in four 3½ tons per hr. cupolas which are charged by hand, a hoist serving the cupola platform. Two of the cupolas are of German manufacture, and a pair are of French design.

The German cupolas are of the hot-blast type and were made in Düsseldorf, the other two (used for melting metal for the malleable foundry) are built according to the system of Professor Guillamon of Paris, the cupolas being lined with a monolithic material, but the body of the cupola is water cooled. All are provided with receivers which are heated in the morning by natural gas. The quantity of coke used is 9 per cent. for grey iron and 14 per cent. for malleable. The coke used comes either from Linz or Belgium, the latter containing a lower sulphur content. Both the sand and the refractories used are of local origin and give every satisfaction.

Sand Distribution

Sand, which is distributed in the foundry by monorail, is prepared in a central plant, manufactured by Stotz of Stuttgart. Sand is carried by band conveyor over the moulding machines where a man is employed on adjusting the ploughs for filling the hoppers over the moulding machines. Beneath the machines, of which there are 29, is a grating through which the spilled sand can fall on to an underground belt conveyor to return it to the central plant. At the end of the upper belt conveyor serving the moulding machines is a large pipe which feeds excess sand on to the spill conveyor.

The knockout (Fig. 2) is furnished with two pneumatic pushers which place the moulding boxes on the grid of the knockout, after which a workman places the boxes on a roller conveyor for their return to the moulding machines. The mixed sand and castings come up by a platform conveyor to enter the hard castings fettling shop. Here, the castings are handled by female labour, placed into stillages and taken to the fettling benches where the sprues are removed. After inspection, the castings are packed with hematite ore into annealing cans which are made of white malleable iron and have a life of about 32 charges. There are six large natural-gas-fired furnaces which are charged by crane, and one smaller furnace, all of which have removable roofs.

Casting Keys

An interesting feature of this foundry is the automatic weighting of moulds which is shown in Fig. 3. In a side shop, the manufacture of keys is carried out. In this section, using simple squeeze machines supplied with pattern plates carrying 40 patterns on each plate, the moulds are finished off using a 32-lb. iron ball which is rolled over the surface. Moulds are assembled in 16-high stacks which are turned at right angles for pouring. One machine in this section makes 100 boxes in a nine-hour shift. Metal is provided by a 3-ton capacity oil-fired rotary furnace. The management are envisaging the purchase of two sandslingers serving turntables for the general work. At the present time, the company is turning out about 50 tons of malleable and 50 tons of grey iron weekly.

The company has a second sand plant which has been designed by the company and built by the Austrian firm, Siemens Bros. For transporting castings, quite neat hand wagons are used. In the fettling shop (used for annealed castings), there are twenty double-ended grinders, a rotary-table shot-blast machine made by a German concern, and another unit which resembles the American Tumblast. The shot used is of Austrian manufacture and comes from Wiener Neustadt. In addition, there is a battery of tumbling barrels which, from the writer's examination, used wet sand.

The company's coreshop is manned entirely by female labour numbering about 24. There are a dozen coreshooters and as they use the CO_2 process, a portable set-up is installed for gassing the cores. Other equipment in this section includes three mixers for making oil-sand cores and a stationary drier. The despatch department is well organized and many of the castings are packed in containers ready for transport to the railway to be handled on special wagons. The firm's laboratory has both chemical and mechanical testing facilities. In the mechanical-testing section, test-pieces are furnished with metal tabs almost as thin as a flash which carry the date of making, and these are kept for six months.

FIG. 9.—*Core for a callender roll used in paper making. (Voith foundry.)*

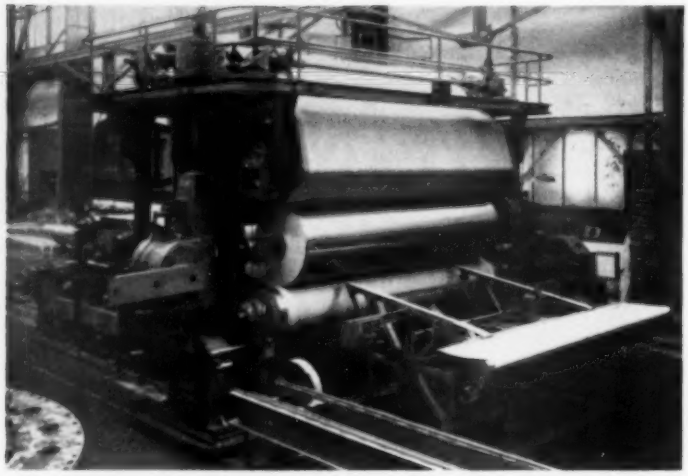


FIG. 10.—*This machine for the production of asbestos sheet incorporates many castings made at the Voith foundry.*

Aluminium Foundry

The company also operates an aluminium foundry which is housed in a separate building 50 per cent of the production is made as sand castings and 50 per cent as pressure-die-castings. Metal for the sand foundry is melted in a natural-gas-fired crucible furnace using Morgan crucibles which are giving good satisfaction as they are lasting six months. Another source of liquid metal is a 300-lb. low-frequency induction furnace, and use is made of a natural-gas-fired heat-treatment furnace. The foundry produces nine types of aluminium alloys. In the pressure-die-castings section, the machines installed produce about 100 castings per hour.

Near the aluminium foundry is a large shop devoted to the automatic production of door and furniture locks. Among the machines used, the writer noted a few of British origin. Another important line of manufacture is the making of shelf brackets for installation in modern shops, as they allow of the adjustable spacing of the shelves.

Finally, the writer is indebted to Herr Bujas, the general director, and to Herr Koller who placed at his service a most competent interpreter.

J. M. Voith, AG, St. Pölten

J. M. Voith, AG, is a limited liability concern which was founded in 1904. It consists of a very large engineering works employing about 3,000 staff, and having an attached foundry employing about 300. The company also has a newly-constructed patternshop which employs some 80 workpeople, including a dozen apprentices who are housed in a special bay designated as the "school." Here in Austria, as in England, industry is largely responsible for the training of its skilled workpeople and there is part-time release for further training of the boys.

The company's patternshop is well equipped. On arrival, timber is seasoned in a special shop and two machines are employed for planing it to size. Other equipment installed consists of two lathes, two types of sanders and a universal miller, all the machines being of German or Austrian manufacture. All the tools used by the patternmakers are supplied by the firm, unlike those of the moulders, who must provide their own.

Most of the raw materials reach the works from a private siding connected with the railway system. For melting, there are two cupolas, one of 6 and one of 9 tons per hr., and a new one is on order of 9 tons per hr. The handling of the raw materials is mainly by hand, but a hoist is used for taking the materials up to the cupola charging platform. Pig-iron for the cold-blast cupolas comes from both Linz and Germany. It is interesting to note, however, that much use is being made of high-carbon coke from Germany. It was stated that before its use, it was normal to use 14 per cent. Linz coke, whereas by changing over to the high-carbon coke, the percentage has been reduced to 8 per cent.

Heavy Castings

The foundry was built in 1904 and is in process of reorganization, especially in the direction of cupola charging and use of synthetic sand. At the moment, natural sand is being used with loam moulding, this being used mainly for making cores. No receivers are in use but the organization of the work is such that there is continuous casting for 4 to 6 hr. Some time ago, an entry was made into the manufacture of automobile castings and three moulding machines and a length or two of roller conveyor were installed. However, this type of work did not fit in too well with the production of large castings for various types of turbines, paper-making machinery, and machinery for making asbestos sheets, and hence this section is now virtually standing idle. The company operates an apprentice school for moulders and coremakers, but there are very few boys; however, it is stated that the situation is improving. The period of apprenticeship is 3½ years.

The foundry is divided into a number of bays, all served by overhead cranes of which there are about 30 according to the average weight of casting made. Each bay is furnished with its own drying stoves as 75 per cent. of the moulds are dried. For the most part of the year, these stoves are fired by natural gas, but in the winter when there

is a shortage of this fuel, a changeover is made to oil, the alteration being carried out in a matter of 20 min. The heavy bay of the foundry can make castings weighing up to 40 tons each. As with all jobbing foundries, the manager finds that the best mouldable designs emanate from their own drawing offices. The small quantity of orders received from outside sources are sometimes (from the foundry point of view) lacking in the appreciation of foundry techniques.

Control Methods

Normally, four grades of iron are made, three are to standard specifications whilst the fourth is a special iron for callender rolls which contain nickel and chromium. Analyses of the iron are made daily, as are also tensile and Brinell Hardness tests. Practical control is carried out at the cupola spout by the making of wedge tests. The firm's laboratory is well equipped and contains an Amsler tensile testing machine, a special drill testing machine and a Brinell hardness tester. Equipment in the chemical laboratory contains a Strohlein carbon and sulphur apparatus, Reichert apparatus for micrographic examination and the usual equipment.

The fettling shop is quite separate from the moulding sections and here the conventional methods of fettling are carried out. A German type of shotblast machine is installed which the writer was assured was 70 per cent. cheaper than the Swiss-made machine. For finishing the larger castings, portable grinders and chippers are used, whilst for the smaller ones, there is the usual battery of double-ended grinders with variable speed control.

Coreshop

Where oil-sand cores are used, they are dried in a vertical continuous drier. Unlike the British counterpart, it has only one reel of conveyors which operates on a 7-hr. cycle and is natural-gas-fired. All cores are blacked and there is a special oven for drying after blacking. Cores which have to withstand high temperatures are painted with zirconia, much after the system common in steel foundries.

The illustrations accompanying this article show (Fig. 1), the general view of the heavy casting bay; Fig. 2, the core for the water-turbine casting; Fig. 3, the casting of a water turbine; Fig. 4, the baseplate for paper-making machinery, and Fig. 5, mould for a turbine-housing casting. A core for a callender roll is shown in Fig. 6, and Fig. 7 shows a major speciality of this firm, *i.e.*, machines for the production of asbestos sheet. It is interesting to note that a Japanese works has recently bought one of these plants.

Social activities provided by the company include a football ground where the works team holds a good place in the 2nd division of works' teams. There is a canteen capable of serving 1,200 meals daily, but the major activity concerns the actual building of houses by the firm for rent to their staff.

Acknowledgment

The writer acknowledges his indebtedness to Dr. Hans Roth, a director of the concern, and Ing. Fachberger, for the many courtesies to him and for the latter's considerable aid in the preparation of this article.

(Further accounts to be printed shortly)

Research in Scotland

A plea for Scottish industrialists to take more advantage of the facilities offered by the Arthur D. Little Research Institute, established four years ago at Inveresk, Midlothian, was made by Lord Bilsland, chairman of the board, at the annual meeting this month. "The Institute offers a service, and has scientists of the highest calibre and equipment to give the service, in a way which should be utilized to a much greater extent by Scottish industry," he said. "We all know how much we need to develop our research effort in Scotland."

The Institute, a non-profit-making organization, is undertaking long-range programmes on a sponsorship basis for industrial firms and Government agencies in Britain, France and the US. Half the sponsoring organizations are British and European, the others being American. The Institute, whose income is about £70,000 a year at present, works in close co-operation with an American organization of the same name.

New Uses for Vitreous Enamel

The use of vitreous-enamel finishes on washing machines had been the subject of successful research, said Mr. F. Pennock, manager of professional and research services at Thomas Hedley & Company, Limited, when he spoke at the annual conference of the Institute of Vitreous Enamellers at Harrogate last month. He stated that a large proportion of the experimental family washes carried out at his company's research home laundry had been undertaken successfully on machines with vitreous-enamel finishes. It was a tribute to this finish that a leading manufacturer of a well-known washing machine had introduced vitreous-enamel interiors for the first time, and had laid down costly plant for this purpose.

Dr. P. W. Ranby, of Thorn Electrical Industries, Limited, forecast a big future for vitreous enamel in the field of electroluminescents. There was another new field in its use with road signs, which was already proving successful in the United States.

Industrial Heating. In publication No. S352, Parkinson Cowan Industrial Products, Dolphin Works, Fitzalan Street, London, S.E.11, present a detailed study of the potentialities of Parkinson-Schwank gas radiant heaters. They are available in many types for industrial and commercial heating. The folder gives information as to preliminary surveys and after-installation servicing.

Foundry Plant. In publication F.P.5, the Incandescent Heat Company, Limited, Cornwall Road, Smethwick, Birmingham, use one side of a leaflet to illustrate more than a dozen installations they have made of dust-arrestors for cupolas, ranging in capacity from 2 to 35 tons per hour. The reverse side of the leaflet illustrates a range of plant used in cupola melting.

British Non-ferrous Metals Research Association

The annual report of the British Non-Ferrous Metals Research Association for 1960 shows that increased attention is being paid to foundry activities. To help in this direction, a skilled moulder has been added to the staff, the melting, moulding and sand-preparing equipment being considered adequate for meeting existing requirements. At the moment a very interesting research is in progress to help with the development of aluminium alloys, especially the 15 per cent. silicon type, for use as motor-car engine-blocks. As in these investigations wear-resistance is of paramount importance a wear-testing machine has been installed in the foundry.

The soundness of heavy gunmetal sections is being investigated, using the BNF alloy type and including a special one containing nickel. Large blocks of the alloys are being cast and then cut up into test-bars, some of these being drilled along their length and then tested for pressure-soundness.

The following two paragraphs taken from the report illustrate the wisdom of non-ferrous founders in supporting the Association.

"An investigation of unsoundness in leaded-bronze bearing-alloys has indicated the conditions under which severe mould reaction is likely to occur as a result of the presence of slight traces of silicon, and has produced at least one useful method of preventing such unsoundness and avoiding the poor surface finish which is a common feature of heavy castings in these materials. Other work suggests that variations in the composition of complex aluminium bronzes have a significant influence on mode of solidification, and hence on the distribution of unsoundness in sand castings and its effects on the tensile properties of the section.

"To obtain good properties in the hypereutectic aluminium-silicon alloys it is just as important to attain the correct particle size of the primary silicon as to avoid unsoundness. Recommendations for obtaining consistent refinement were recently reported to members, with information on how such refinement would be affected by section thickness and by foundry variables such as the duration of a degassing treatment. The technical advantages of the hypereutectic alloys would depend greatly on machinability, wear resistance and stability of properties on exposure to elevated temperatures, and tests on these properties are in progress to determine the optimum composition."

Other "foundry" work being carried out by the Association includes the plating of die-castings; the rapid analysis of alloys by spectrographic means, fundamental work on the new metals such as titanium, thorium, zirconium and uranium alloys, and investigations of metals suitable for domestic water supply.

Exporters welcome Advice from Board of Trade

Speaking at a recent luncheon of the London branch of the National Union of Manufacturers, Mr. F. J. Errol, Minister of State, Board of Trade, said that over the past few months he had written to 30,000 firms asking if they would like details of the Government service to exporters.

"All those who said they would have been visited by an export officer from one of the Board of Trade regional offices. As a result the number of visits being paid to firms by the officers has been running at something like 1,500 to 2,000 a month—a truly remarkable achievement," he added.

British Standards Institution

Three additional grades of iron are covered in the revised British Standard for Iron Castings with Spheroidal or Nodular Graphite (BS.2789:1961). The types of iron now covered are those with:—a ferritic matrix in which resistance to impact is of paramount importance; a mainly ferritic matrix of moderately high-tensile strength in which high ductility and toughness are of great importance; a ferritic-pearlitic matrix combining strength with reasonable ductility and forming an intermediate grade; and a mainly pearlitic matrix, characterized by high-tensile strength, but in which ductility and resistance to impact are of less importance (three grades of this type are covered).

The method of designating the irons has been brought into line with modern practice; letters indicate the general type of iron and figures represent the minimum tensile strength and elongation to be expected from each grade. A table broadly relates the grades to those specified in the 1956 edition.

Clauses deal with freedom from defects, provision of test samples, optional tests, mechanical tests and properties. Recommended forms of test samples and recommended dimensions for tensile test-pieces are given in appendices. The standard's explanatory introduction which briefly covers the history and properties of the irons, will be useful for reference.

Copies of the standard may be obtained from the British Standards Institution, Sales Branch, 2, Park Street, London, W1; price 5s. each (postage extra to non-subscribers).

Shipyards to fight Revaluations

The Clyde Shipbuilders Association and the Scottish Council of the Federation of British Industries are among organisations preparing for a battle on behalf of their member-firms, many of whom have been "staggered" by the sharp increase in their revaluations. While the shipbuilders are at this stage keeping their own counsel they are known to be deeply concerned also at the prospect, in two years' time, of industrial derating.

They point out that many "tools of the trade," such as cranes and dry docks, are rateable subjects. In these circumstances they contend that they will be asked to carry a double burden. It is probable that eventually they will seek a meeting with Lord Craigton, Minister of State, Scottish Office, at which these and other representations will be made.

The FBI, as a preliminary to their fight against the revised valuations, have sent out a questionnaire to 260 of their member firms in different parts of Scotland, and the National Union of Manufacturers have also discussed arrangements for distributing a questionnaire on valuation among their 250 member-firms.

Machine-tool Survey

In what is believed to be one of the most extensive surveys of its kind ever arranged in this country, more than 17,000 UK metalworking firms are being asked to complete six-page questionnaires giving details of the age and origin of their machine-tools. The survey has been prepared at the request of the Machine Tools Trades Association.

The questionnaires, now being sent out, will ask firms to classify their equipment into three groups: units under 10 years old; units from 10 to 20 years old; and units over 20 years old.

American Letter

Specifications

American Society for Testing Materials

At a meeting held last December, sub-committee B 7 (light metals and alloys) of the American Society for Testing Materials dealing with gravity-die-castings recommended that "tensile requirements for test-bars machined from castings should not exceed those for separately-cast test-bars; that the tensile requirements be limited to sections not greater than 2-in. thick, and that tensile requirements should not apply to sections under feeders." Another recommendation was "that prevailing test-bar mould-design and performance be investigated to determine whether changes would increase tensile properties."

Copper/Nickel Alloys

At a meeting held in January, sub-committee B-5 (copper alloys) put forward a tentative specification for two copper/nickel alloys, ASTM designation BXXX 60T. The two alloys covered in the specification have nominal compositions as follow: (A) (90-10) —Cu 87.5, Ni 10.0, Fe 1.5; Si 0.1, and Mn 0.9 per cent., and composition (B) (70-30) — Cu 68.0, Ni 30.0, Fe 0.7, Si 0.5 and Mn 0.8 per cent. Tensile requirements for both alloys were given as: Alloy (A)—tensile strength (min.) 20 tons per sq. in., yield strength (min.) 11 tons per sq. in., elongation on 2 in. (min.), 20 per cent. Alloy B—tensile strength (min.) 27 tons per sq. in., yield strength (min.) 14 tons per sq. in., and elongation in 2 in. (min.), 20 per cent.

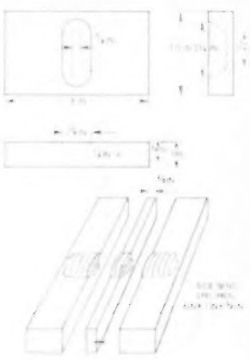


FIG. 1.—"*Weldability*" *test-block proposed by the American Society for Testing Materials for copper/nickel alloy castings subsequently to be welded.*

Weldability Test

The committee also made three recommendations regarding weldability tests as follow: (a) At least one test-block shall be prepared for each batch of welding grade castings (Fig. 1); (*b*) the block shall be moulded, gated and fed in a manner to produce a sound casting, free from defects which might interfere with welding or the interpretation of the results of the test, and (*c*) the groove in the test-block shall be completely filled with weld deposit, using the metallic-arc process with $\frac{1}{8}$ or $\frac{5}{32}$ in. dia. 70-30 Cu/Ni coated electrodes conforming to AWS E Cu/Ni. Interpass temperature does not need to be controlled unless it has to be controlled in fabrication.

Cast Iron

The American Society for Testing Materials, sub-committee A-3, on cast iron, also held a meeting in February to deal with specifications. Minor changes in casting specifications were as follow. Tests upon short (7-in.) and long (12-in.) test-bars for tensile specimens developed data indicating that the short bar gave inferior results to the extent of 10 per cent. lower in many cases than the tensile specimens cut from the long bar.

Specifications for austenitic spheroidal-graphite iron were proposed. The harmonizing of the Society of Automotive Engineers' specifications with those of ASTM was discussed and arrangements made for their accomplishment. Some of the very-high-carbon brake-drum specifications were described as being still out of "phase." The sub-committee dealing with elevated temperatures reported upon progress with tests upon cast iron, and new work on thermal fatigue was proposed for application to automobile and diesel-engine parts. In the s.-g. iron, specifications for paper-mill pressure-vessels and rolls were to be devised along the lines of the as-cast 80-60-03 grade of s-g. iron. Progress with the classification of graphite in s-g. irons was reported and it was announced that the latest results were to be published in a paper to be presented at last month's meeting of the American Foundrymen's Society.

Investment Casters' Conference

A technical course which will examine melting and solidification behaviour in investment casting is to be sponsored by the US Investment Casting Institute at Case Institute of Technology on June 20 and 21. Lectures during the two-day conference will include: "Fundamentals of Melting and Solidification Behaviour of Metals," by J. F. Wallace (Case Institute of Technology); "Employment of Melting and Solidification Principles in Investment Castings," by M. C. Flemings (Massachusetts Institute of Technology); "Principles of Heat Flow in Refractory/Molten Metal/Atmosphere Systems," by C. M. Adams, Jr. (Massachusetts Institute of Technology); "Theory of Gating and Risering applied to Investment Casting," by J. F. Wallace; "Causes and Prevention of Hot-tears in Investment Castings," by J. Zotos (Northeastern University), and "Influence of Investment Casting Variables in Heat Flow," by Hyman Rosenthal (Frankford Arsenal). In addition, representatives from industry will participate in discussions. The course is open to all interested in investment-casting technology; additional information can be obtained from the Investment Casting Institute, 27, East Monroe Street, Chicago 3, Illinois.

Preheating Furnace increases Production

A specially-designed preheating furnace was recently put into operation in the Griffin Wheel Company, Colton, California, to preheat freight-car wheels prior to their entry into the Lindberg rotary-hearth heat-treatment furnace. The preheating furnace was designed and constructed by the industrial division of Lindberg Engineering Company, Chicago, Illinois, and according to an article appearing in the December, 1960, issue of the American journal *Industrial Heating*, its installation has enabled Griffin Wheel Company to increase production by 25 per cent. Prior to its use, it is stated that the car wheels required 1½ hours in the rotary-hearth furnace to meet the hardness specifications. The rotary-hearth furnace with the new preheating furnace replaces vertical pit-type furnaces which stacked the wheels 20 high and required 4 to 5 hours in the furnace.

The article states that the new installation preheats 30 wheels an hour from a temperature of approximately 538 to 815 deg. C. The new furnace is of the direct, over-fired design and uses natural gas and propane combustion gas burners firing along both side walls throughout the lengths of the heating chamber. Spent gases are carried to the top of the furnace through exhaust ports at hearth level and flues located in the furnace walls. The combustion equipment is divided into two zones, each extending approximately half the furnace length and both being independently

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controlled and operated. The wheels to be preheated are conveyed through the heating chamber on alloy pedestals supported by a double-chain roller conveyor. Roller chains travel through the furnace heating chamber in water-cooled steel troughs embedded within the refractory-furnace hearth. This design allows the use of carbon-steel chains without loss of the strength normally encountered in high-temperature operation. The conveyor is actuated by a hydraulic pusher cylinder which is cycled and indexed in accordance with the operation of the rotary-hearth furnace. The wheels are charged directly from the roller conveyor on to the preheating furnace conveyor by depressing the last section of the roller conveyor when a wheel is directly above a furnace conveyor pedestal. The conveyor is then indexed forward carrying the wheel into the heating chamber. Wheels are discharged from the furnace by a series of cantilever-driven rollers and carried directly to the conveyor section feeding the charge manipulator on the rotary furnace. The cantilever rollers are sprocket driven at a constant rate and those exposed to high temperature are equipped with water-cooled bearing-shafts. The wheels engage the rollers by lowering the level of the furnace conveyor at the discharge point and the wheels are discharged from the heating chamber rapidly to prevent an excessive drop in temperature prior to charging into the rotary heat-treatment furnace.

Next, the article describes the rotary-hearth furnace, saying that it is fully automated and has a diameter of 44 ft. The wheels enter the furnace from the preheating furnace automatically *via* a conveyor system. Charge manipulators inject the wheels into the furnace where they are conveyed a full 360 deg. around the circular-built furnace for a period of 62 minutes. In this time, the wheels are heated to the desired temperature which is followed by a special air-quench to meet the required specifications of ductility and hardness. The Griffin Wheel Company has similar rotary-hearth installations in the US and Canada.

Canadian Motor-car Statistics

Nearly three of every 10 new cars sold in Canada last year were imported from the US, the UK or Europe. An estimate for 1961 is that three out of every 10 Canadians buying a new car will drive away in a British or European model; Canadians will probably continue to buy imports which have stood the test of Canadian highways and climate, and the lower-priced Canadian makes such as Ford, Chevrolet and Pontiac. US "compact" cars have not been successful, possibly because of their higher Canadian price.

Contributions to the Canadian economy made by companies importing cars from Europe were stressed in briefs submitted to the Bladen Commission of Canada late last year by H. Gordon Munro, president, Rover Motor Car Company of North America and chairman, British Motor Industry in Canada.

Current Rover purchases of aluminium amount to 13.4 million pounds, worth $4.5 million, three times the value of Rover vehicle exports to Canada.

Motor vehicles for the first half of 1960 have risen to become 25.5 per cent. of the UK exports to Canada which, in the period, amounted to $315 million. In the same half-year, Canada exported $490 million worth of goods to the UK. The solution to the problems of the Canadian automobile industries must centre around the current imports of more than $334 million annually from the US. This represented 58.7 per cent. of all Canada's imports of vehicles from the UK, US and Europe combined.

Nine Canadian subsidiaries of British automobile manufacturers have invested $12 million in service organizations in Canada; their 1,000 dealers $30 million more. Volkswagen, which doubled its facilities in Toronto, suggested that imports probably would level off at about 25 per cent. of new car sales in Canada. It is estimated that the new-car market for 1961 will equal or better 1960, when Canadians bought approximately 425,000 new cars.

US Automobile Exhibition

Over 335,000 visitors attended the fifth International Automobile Show which completed a nine-day run in New York City on April 8. More than 400 cars from ten countries were on view and, in addition to the United States, countries represented were Great Britain, France, Germany, Italy, Japan, Sweden, Holland, Czechoslovakia and Israel, the latter exhibiting for the first time. The Soviet Union, which showed two models at the 1960 exhibition, did not participate this year.

Of the 80 makes of car on view, 68 were from overseas and 12 only from the US. The largest and most varied single national exhibit consisted of 23 makes of British cars and at times it was impossible to walk through the area of the exhibition where Jaguar was introducing its line of high-speed, high-priced versions of its D-type racing cars. Volkswagen, too, got a large share of attention. The imports had a near monopoly in true sports cars, the only US-built competition was from General Motors' Corvette.

The big advantage of the economy cars from abroad still is their lower cost, all have slashed prices sharply except for Volkswagen, which increased its price by $30 to compensate for the recent 5 per cent. revaluation of West Germany's currency. The small-sized, lightly-powered economy car from abroad in the $1,600 price range still has no American counterpart and won't have for at least another year.

The number of foreign cars of varying national origins and vintages actually licensed for driving in the US exceeds the 1,000,000 mark.

New US Car?

Speaking before the Southern Research Institute at Birmingham, Alabama, recently, Mr. Henry Ford hinted that the Ford Motor Company plans to introduce a new car in the US containing some parts made overseas. The reports said the car, to be named the Cardinal, would contain parts built in Ford plants in England and Germany, so that the company could lower the cost to the $1,600 price range of the Volkswagen. Mr. Ford said a company must buy in other countries to remain competitive and added that such a course could mean added sales, added jobs and added profits for the American automobile industry and its suppliers. In many cases, he said, a low-cost imported part or component might make it economically feasible to produce or assemble in the US a complete product that would otherwise be produced abroad, or not at all. Clearly, such imported parts created jobs.

Mr. S. M. HEGEDUS has been appointed to the board of Chrysler Motors, Limited, and Dodge Bros. (Britain), Limited. He also takes on the duties of treasurer-controller of both companies. He joined Chrysler in 1957 as a staff specialist in the Corporation's export division which subsequently became Chrysler International S.A., the Geneva-based company which looks after all Chrysler interests outside the US and Canada.

SECTION DEVOTED TO THE TECHNOLOGY OF PRODUCING DIMENSIONALLY-ACCURATE CASTINGS

BICTA's Third Annual Conference

Summary of Proceedings held in London in May

Account of the general meeting and annual dinner, the year's activities and committee reports of the British Investment Casters' Technical Association. The accentuation of the proceedings was on the attainment of high quality along with technical improvement, but aspects of safety, costing procedures and process details were also considered.

The third annual conference of the British Investment Casters' Technical Association was held in London from May 15 to 17, under the chairmanship of Mr. R. W. N. Danielsen, M.B.E., T.D. (of Deritend Precision Castings, Limited). The conference was better attended than its predecessors which demonstrated that the enthusiasm shown and standard of technical papers presented on the two previous occasions had provided a solid foundation for the success of this and future events. Some 70 delegates, representing the industry and kindred interests attended the technical sessions. The members also had pleasure in welcoming a number of overseas delegates including Mr. H. J. Meerkamp van Embden (Philips Gloeilampfabrieken, Holland, president of the European Investment Casters' Conference, Dr. E. J. Nickel (Deutsche Edelstahlwerke Aktiengesellschaft, Germany) chairman of the metallurgy committee of the *Verein Deutscher Giessereifachleute*. Mr. Roger Waindle (WaiMet Alloys, Limited) vice-president (technical) of the Investment Casting Institute of the USA together with Mr. Chet Seagin and Mr. Warren Argue (Austenal Processes Inc., USA).

Annual Meeting

The conference proper was preceded on the afternoon of Monday, May 15, by the annual business meeting and in the evening by an informal cocktail party. At the annual general meeting, the

General view at the third annual dinner of the British Investment Casters' Technical Association held in the Connaught Rooms, London (the top table is shown in the right background).

adoption of the annual report for the year ended March 31, 1961, was moved by the chairman who made particular mention of the endeavours of the various committees the personnel of which had carried out such valuable work during the year. Special tribute was paid to Mr. John Bolton whose efforts whilst secretary during the formative years of the Association had produced solid foundations on which to build. There were four vacancies for full members on the Council and the two retiring members—Mr. W. Foyers (H. & F. Precise Castings, Limited) and Mr. D. H. Armitage (P.I. Castings (Altrincham), Limited) were re-elected together with Mr. D. C. Jarman (de Havilland Engine Company, Limited) and Mr. D. Morris (Birmingham Small Arms Company, Limited). Mr. L. S. Taylor (G. L. Willan, Limited) representing associate members retired by rotation and was re-elected.

Following the formal business meeting, the reports of the four technical committees were presented for discussion, by Mr. L. S. Taylor (G. L. Willan, Limited), on metallurgy; Mr. N. Walker (Hadfields, Limited), on technical publicity; by Mr. W. S. Fowkes (H. & F. Precise Castings, Limited), on industry statistics and by Mr. Roy Taylor (Firth Vickers Stainless Steels, Limited) on industrial health and safety.

Technical Sessions

On the morning and afternoon of Tuesday, May 16, and the morning of Wednesday, May 17, there were eight papers presented and discussed under the chairmanship of Mr. G. A. Tomkinson (D. Napier & Son, Limited), Mr. D. H. Armitage, Mr. R. W. N. Danielsen, Mr. W. Foyers, Mr. N. Walker and Mr. L. S. Taylor, respectively. These papers were as follows:—"Silica Binders for Shell Investment Casting," by E. J. Shepherd, PH.D., A.R.I.C. and N. Lewis, B.SC.; "Polystyrene, a Material for Patterns," by C. H. Waxman, B.SC., A.P.I.; "Health and Safety in the Investment Foundry," by G. E. Tubich, B.S.; "Control of Product Quality," by F. Nixon, B.SC. (HONS.ENG.), M.I.MECH.E., F.A.AE.S., M.I.PROD.E.; "Dynamic Accountancy," by E. A. Ede, F.A.C.C.A., A.C.I.S., F.C.W.; "Recent Developments in Alloys for Gas-turbine Rotor-blading," by E. Glenny, B.SC., F.I.M.; "Tensile Ductility and Stress Rupture Properties of Investment-cast Nimocast 90," part 1, by G. F. Smith, A.MET., A.I.M. and part 2 by R. M. Cook, B.SC.(ENG.) and P. J. Penrice, B.SC.(ENG.) and "Reliability of Steel Castings," by Roger Waindle, B.S., M.E. Each of the technical sessions was attended by some 50 members.

The papers presented and reports of the lively discussions which ensued will be published in future issues of this JOURNAL.

Dinner

Some 110 members, their ladies and guests attended the third annual dinner of the Association held at the Connaught Rooms, London, W.C.2, on May 16, as part of the conference proceedings. Attending the dinner also were visitors from overseas—Dr. E. J. Nickel (Germany), Mr. H. J. Meerkamp van Embden (Netherlands), Roger Waindle (U.S.A.), Mr. N. Herzmark and Mr. J. Marshall (Paris). Mr. R. W. N. Danielsen occupied the chair and accompanying him at the top table were Mr. W. Foyers (vice-chairman of the association, Sir Miles Thomas, Mr. H. J. Meerkamp van Embden and Mr. Frank Nixon (Rolls-Royce, Limited), most of whom were accompanied by their ladies. After the loyal toast, Sir Miles Thomas proposed the toast of "The British Investment Casters' Technical Association," the response being made by Mr. R. W. N. Danielsen in which he mentioned the increase in membership of the Association. Mr. W. Foyers proposed "the Guests" and Mr. Frank Nixon replied. The previous day Mr. Danielsen and Mr. Foyers had been re-elected respectively to the chairmanship and vice-chairmanship of the Council for a further term of office (the period to commence after the close of the conference). The speeches were followed by a presentation to Mr. John Bolton who had retired as secretary of the Association during the course of the year on assuming the post of director and secretary of the British Steel Founders' Association. Mr. Bolton made a short speech of thanks.

ANNUAL REPORT

Following the proceedings of the annual meeting, the Council took pleasure in submitting to the members the third annual report for the year ended March 31, 1961, and the accounts for the same period. In doing so, it recorded the consolidation and progress of the work started by the Association in its first two years. It also noted, with some satisfaction, that the Association was being increasingly recognized and the value of its services to producers, users and potential users of castings had been appreciable. The report continued as follows:—

Council

Seven meetings of the Council have been held during the year. Mr. D. H. Armitage, the founder-chairman of the Association, retired on completion of his second term of office after the Annual Conference in May, 1960, but retained his seat on the Council. Mr. R. W. N. Danielsen, also a founder-member of the Association, was elected Chairman of the Council, his term of office commencing with the closure of the Annual Conference on May 18, 1960. Mr. W. Foyers was elected vice-chairman of the Council at the Council meeting held during May.

Mr. D. H. Armitage and Mr. W. Foyers, representing full members, and Mr. L. S. Taylor, representing associate members, retire from the Council by rotation at the forthcoming annual general meeting and, being eligible, offer themselves for re-election by their respective membership classes in accordance with the Constitution.

The Council records its thanks to the chairmen and members of the various committees and their

Second photograph of the annual dinner (taken from the opposite end of the hall). Many prominent members can be distinguished among the gathering.

companies for the benefit of their knowledge and advice which has been placed at the service of the Association.

Committee Activities

The Metal Specification Committee, whose title was changed to the Metallurgy Committee during the course of the year, due to the widening scope of its activities, has been represented on the appropriate committees of the British Standards Institution and in doing so has represented the interests of investment founders in the production of standard specifications related to the industry. It has also been responsible for collecting and summarizing technical data for future use and for initiating investigations into certain metallurgical problems peculiar to the industry.

The Technical Publicity Committee have again made a great contribution in the provision of information on investment castings to technical societies, colleges and universities through the medium of teaching aids and visiting lecturers. In other directions, the Committee has been active in producing editorial matter for publications and material for exhibitions. The aim has been to educate the designer and the young engineer in the many advantages and widespread uses of investment castings.

The Industry Statistics Committee has been concerned in the preparation of questionnaires designed to gather more specific information about the industry and its markets. A second annual survey has been completed with the co-operation of the majority of major producers of investment castings. Another questionnaire dealing with current trends has been circulated within the Association's membership. It is considered that surveys of this type, which are issued at intervals, will yield a valuable picture of the development of the industry as a whole. Only by a regular accumulation of information can there be any basis for decisions based on statistical facts.

The Industrial Health and Safety Committee has made some progress during the year but the activities have been retarded due to the illness of the chairman. The Committee, chairman and the Council are anxious to encourage additional members to join the Committee in order to press forward with work on the problems of health and safety. These cover an extremely wide range and the Council feel certain that the work of this Committee is both necessary and invaluable.

Committee Membership

The membership of the Committees at March 31, 1961, is shown below:

Metallurgy Committee: Chairman: Mr. L. S. Taylor (G. L. Willan, Limited), Mr. I. L. Gwynn (P. I. Castings (Altrincham), Limited), Mr. A. G. Mason (Deritend Precision Castings, Limited), Mr. G. F. Smith (Hadfields, Limited), Mr. B. W. Prince (Firth-Vickers Stainless Steels, Limited), Mr. D. R. Wood (The International Nickel Company (Mond), Limited), Mr. J. Hilling (D. Napier & Son, Limited), Mr. M. Riddihough (Deloro Stellite, Limited), Mr. A. Schofield (The de Havilland Engine Company, Limited).

Technical Publicity Committee: Chairman: Mr. N. Walker (Hadfields, Limited), Mr. J. J. Cad-

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wallader (H. & F. Precise Castings, Limited), Mr. D. E. Hope (Monsanto Chemicals, Limited), Mr. W. N. Jones (Deritend Precision Castings, Limited), Mr. N. Mason (Firth-Vickers Stainless Steels, Limited), Mr. P. G. Chapman (P.I. Castings (Altrincham), Limited), Mr. C. W. Andrews (D. Napier & Son, Limited), Mr. D. Morris (The Birmingham Small Arms Company, Limited).

Industry Statistics Committee: Chairman: Mr. W. S. Fowkes (H. & F. Precise Castings, Limited), Mr. G. L. Willan (G. L. Willan, Limited), Mr. L. L. Greig (Deritend Precision Castings, Limited), Mr. P. Jackson (P.I. Castings (Altrincham), Limited), Mr. C. W. Andrews (D. Napier & Son, Limited), Mr. N. Mason (Firth-Vickers Stainless Steels, Limited).

Industrial Health and Safety Committee: Chairman: Mr. R. Taylor (Firth-Vickers Stainless Steels, Limited), Mr. W. O. Beer (D. Napier & Son, Limited), Mr. F. Evans (P.I. Castings (Altrincham), Limited), Mr. C. H. Frampton (The de Havilland Engine Company, Limited).

The Council also records its thanks to the following who served on the Committees during the year:—Mr. A. F. Eyres, formerly of The Birmingham Small Arms Company, Limited, and Mr. J. Hendry of Preformations, Limited, who served on the Technical Publicity Committee. Mr. W. Hinchcliffe of Samuel Osborn & Company, Limited, and Miss A. E. Lane formerly with D. Napier & Son, Limited, who served on the Metallurgy Committee. Mr. E. J. Crawley of Chambers Brothers, Limited, who served on the Industry Statistics Committee.

Membership

The Council are pleased to announce that one new full member joined the Association during the year, the de Havilland Engine Company, and we welcome them to the Annual Conference as members, therefore, for the first time. Due to the closure of their investment foundry, Preformations, Limited, resigned from membership. The Council would like to record that in their attempts to recruit new members, numerous contacts have been established and visits have been made to potential member foundries. It is hoped that these approaches will encourage new members in the future. In the case of associate members, the Council desire to record that there has been a net gain of one member in this class during the year. Chambers Brothers, Limited, sent in their resignation and the following two companies were welcomed to Associate Membership:—Jessop-Saville, Limited, H. B. Fillers, Limited.

Membership of the Association at March 31, 1961.

Honorary Member
Dr. J. D. Jevons (Joseph Lucas Limited).

Full Members
The Birmingham Small Arms Company Limited.
Deloro Stellite Limited.
Deritend Precision Castings Limited.
Firth-Vickers Stainless Steels Limited.
Hadfields Limited.
The de Havilland Engine Company Limited.
H. & F. Precise Castings Limited.
D. Napier & Son Limited.
P.I. Castings (Altrincham) Limited.

Associate Members
A.P.V.-Paramount Limited.
Astor Boisellier & Lawrence Limited.
Claud Campbell Waxes Limited.
H. B. Fillers Limited.
W. J. Hooker Limited.
The International Nickel Company (Mond) Limited.
Jessop-Saville Limited.
Joseph Lucas Limited.
Monsanto Chemicals Limited.
Morgan Refractories Limited.
Samuel Osborn & Company Limited.
Refractory Mouldings & Castings Limited.
Spartan Steel & Alloys Limited.
Colin Stewart Limited.
Wilkins, Campbell & Co. Limited.
G. L. Willan Limited.

Finance

Full use has been made of the larger income due to the rise in subscriptions agreed to at the last annual general meeting. This has permitted greater activity by the Committees and has covered the accepted increase for secretarial charges by The British Steel Castings Research Association. Details of expenditure are itemized in the income and expenditure account for the year under review which is attached herewith.

Conferences and Meetings

In addition to the seven meetings of the Council and the 16 meetings of the technical committees held during the year under review, the Second Annual Conference was held in the Connaught Rooms, London, W.C.2, on May 16 to 18, 1960. The Conference was attended by over 70 delegates from member and non-member companies and interested parties. Following the annual general meeting the Conference received the presentation and discussion of six technical papers, one of these being an exchange paper from the Investment Casting Institute of the USA. Additionally, the American visitors exhibited a film on the Investment Shell Technique and slides showing the pro-

Composite assembly of informal groups photographed before and during BICTA's annual dinner: (a) the chairman, Mr. Danielsen (right) and Mrs. Danielsen are shown welcoming Mr. and Mrs. Bolton; (b) and (f) are groups consisting of Sir Geoffrey Lowles (Wilkins, Campbell & Company, Limited), Sir Miles Thomas (Monsanto Chemicals, Limited) and Lady Thomas; (c) Mr. and Mrs. Danielsen receiving Mr. D. H. Armitage (P.I. Castings (Altrincham), Limited) (obscured) and Mrs. Armitage; (d) "hands across the sea"—Mr. Roger Waindle (WaiMet Alloys, USA) who had suffered an automobile accident—and Mr. Frank Nixon (Rolls-Royce, Limited); (e) welcome to Sir Miles and Lady Thomas; (g) tête-à-tête between Mr. Danielsen and Sir Geoffrey Lowles at the reception; (h) Sir Miles and Lady Thomas photographed on their own, and (i) the chairman, in jovial mood, welcoming Mr. E. A. Ede.

duction methods of a large investment foundry. A highlight of the Conference was the annual dinner attended by some 90 delegates and their ladies and was presided over by the Chairman, Mr. D. H. Armitage. Mr. John Osborn, M.P., was the principal guest. The Association was also represented officially at the Seventh European Investment Casters' Conference at Liège by Mr. John Bolton and a report was prepared by him and published in the FOUNDRY TRADE JOURNAL dated September 1, 1960.

Works Visit

Through the courtesy of Monsanto Chemicals, Limited, members of the Association were able to participate in a most interesting visit to the Monsanto Research Laboratories, Fulmer, Bucks, on November 2, 1960. Over 30 members took advantage of this invitation and had an opportunity to study recent developments of the Shell Investment Technique and other aspects of research being conducted there. The Council wish to record their appreciation of the courtesy extended by Monsanto Chemicals, Limited.

Publications

The FOUNDRY TRADE JOURNAL have continued to provide run-on copies of their pages containing the papers presented at the Second Annual Conference. It has thus been possible to provide all members with a volume of the Proceedings of the Conference at little cost. During the year, the Technical Publicity Committee prepared a leaflet entitled, "What is an Investment Casting?" The primary purpose of the publication was for distribution at the Minibition of the Purchasing Officers' Association held at Scarborough on September 29 to October 1, 1960. Some 5,000 copies were printed and they have been distributed widely at lectures to technical societies given by members of the Technicai Publicity Committee. An innovation during the year under review has been the introduction of the "BICTA Newsletter." This publication is being issued quarterly in order to keep members and all other producers in the industry informed of the activities and interests of the Association. An amended version of the bibliography, which lists references to some of the major publications on the subject, was produced during the year for issuing to inquirers, particularly technical college lecturers.

Library Service

Due to the agreement concluded during the year with the British Steel Castings Research Association on the matter of secretarial charges, they kindly agreed to waive the payment of an additional contribution for the use of the BSCRA Library and Information Service. The Service and the supply of *Investment Casting Abstracts* was thus made available to all members. These abstracts are issued every two months and provide members with a review of the world's literature on all aspects of the industry, covering the production of both ferrous and non-ferrous alloys. The Council wish to record their thanks to the BSCRA for the considerable benefits and advantages this additional service has brought with it.

External Relations

Relations with external bodies have continued to be fruitful. We had the pleasure of welcoming to the 1960 Annual Conference a number of representatives of corresponding organizations from overseas. Representing the European Investment Casters' Conference was Mr. H. J. Meerkamp van Embden. Dr. E. J. Nickel, Chairman of the Investment Casters' Committee of the *Verein Deutche Geissereifachleute* also attended, as well as representatives of the Investment Casting Institute. The cordial relationships being maintained with the latter body has resulted in the offer of some excellent exchange papers for presentation both at the Conference in 1960 and the forthcoming Conference in 1961. The exchange of information on market surveys and metal specifications with the various overseas bodies also continues on a useful basis. The Association, together with the BSCRA, has sponsored an investigation into a specific aspect of research. This will be dealt with more fully in the report of the chairman of the metallurgy Committee as will the Association's representation on the committees of the British Standards Institution.

Secretary

During the year, the Council learnt with great regret they were to lose the services of Mr. John Bolton who had been secretary of the Association since its formation in 1958. On October 1, 1960, he took up his new appointment as director and secretary of the British Steel Founders' Association. The Council wish to record their grateful thanks to Mr. Bolton, not only for his zeal and the time he devoted to the affairs of the Association, so much of it outside normal working hours, but also for the efficiency with which he carried out these duties during the formative years.

At an Extra-ordinary General Meeting held on November 17, 1960 (under the terms of the Constitution), Mr. E. G. Donaldson was appointed secretary of the Association. We wish him well.

Conclusion

The Council feels sure that the affairs of the Association are progressing satisfactorily and that the year under review has shown consolidation of its work. In certain directions the activities of the Association have been extended and developed. Finally, the Council wishes to record its thanks to Dr. A. H. Sully and the BSCRA for all the assistance and guidance which they have given to the Association.

(On behalf of the Council, the Report is signed by Mr. R. W. N. Danielsen, the chairman.)

COMMITTEE REPORTS

Metallurgy

During the year the title of the Committee has been changed from that of Metal Specification Committee to Metallurgy Committee. This was sanctioned by the Council, on the recommendation of the Committee, as it was considered that the scope of the Committee's work was tending to extend beyond the original terms of reference. The terms of reference of the Committee were widened to cover the new work being undertaken.

During the year the Committee has made progress on a number of projects with which it has been concerned. A summary of these activities is given below:—

British Standards

The Association were represented on three British Standards Institution committees concerned with standards related to the industry As a result of the work carried out by British Standards Committee ISE/60 B.S., 3146: Part 2 " Investment Castings in High Alloy Steels, Nickel and Cobalt Alloys " was completed and issued early this year. BICTA was well represented in ISE/60 and took an active part in its work. Discussions within the BICTA Metallurgy Committee resulted in a significant number of amendments being put before ISE/60 which were subsequently accepted. The Metallurgy Committee wishes to thank members for their co-operation in supplying test data which was essential for the compilation of realistic and practicable specifications. Consideration has been given to the advisability of initiating a British Standard for Investment Castings in copper and aluminium-base alloys. Statistical examination of data obtained from member foundries showed that investment castings in certain of these alloys give better properties than those shown in the equivalent British Standards for sand castings. In view of the limited data available, however, and the lack of strong customer demand to the British Standards Institution for such specifications, the Committee consider the present time inopportune to approach the British Standards Institution. It is interesting to note that one quarter of American investment casting sales in 1959 were accounted for by these alloys and the question of specifications for these alloys will be raised with the British Standards Institution when more comprehensive data have been obtained.

The Committee has issued to members, an interpretation of the chemical composition requirements of B.S. 3146: Parts 1 and 2, which required some clarification. The Association was also represented on the British Standards Institution committees concerned with surgical implants and appliances. Difficulty has been encountered in obtaining recognition for certain types of investment castings in the British Standards covering these fields. The British Standard for surgical implants permits the use of wrought but excludes cast En 58J alloy but allows both wrought and investment cast forms for certain of the cobalt base alloys. The Metallurgy Committee is conducting a series of tests with investment-cast and wrought bar in En 58J-type stainless steel, to determine the validity of the objections which led to the exclusion of investment castings in this alloy from the current British Standards. If this initial programme indicates that the investment castings are satisfactory, it is hoped to arrange more exhaustive tests to be carried out in conjunction with an acknowledged authority in this field of work.

Mechanical Test Data

Mechanical test results for certain of the alloys covered by Part 2 of B.S. 3146 were collected from members and statistically analysed. The data obtained, materially assisted the BSI committee in determining reasonable representative properties for these alloys. The design of impact-test pieces has been considered with a view to smaller bars being adopted. In view of the limited number of specifications calling for impact tests and the difficulty in correlating impact values differing from the standard Izod, it was decided to leave this matter in abeyance.

Thirteen per cent. Chromium Steel

The Association is participating in the research programme being carried out by the British Steel Castings Research Association concerning the factors affecting the properties of cast thirteen per cent. chromium steel. The publication of results is normally made to members when the work has reached a definitive stage and at the discretion of the BSCRA. A specific programme concerning the factors affecting the formation or fusion or " Spotted Dick " on thirteen per cent. steels has been sponsored by the Metallurgy Committee. The Committee is guiding work being carried out both by the BSCRA and by member foundries and the work is now well advanced. An interim report covering the work to date is available for inspection by members. On completion it will be circulated as a confidential report to members. In conclusion, the Committee would like to thank members for their co-operation in varied ways during the year.

(This committee report is signed by Mr. L. S. Taylor, its chairman.)

Technical Publicity

At the five meetings of the Committee held during the year, important progress was made with a number of activities with which the Committee is concerned. The aim has been to educate the public on the use of investment castings, the advantages accruing and the wide range of possibilities. The main targets have been the engineer and designer both established and in training and the potential buyers of investment castings. In this exercise, the Committee have made considerable progress as is reported below.

Exhibitions.

Following the success of a similar venture in 1959, a stand was organised at the Purchasing

BICTA's Third Annual Conference

Officers' Minibition which was held at Scarborough towards the end of September. A leaflet entitled, "What is an Investment Casting?" was especially produced for the occasion—a large number were taken up. The Committee consider that the Exhibition was an outstanding success, reaching the right people and laying a sound foundation for future progress. The message behind the display was the replacement by investment castings of articles produced by other methods and a number of such successful applications were exhibited. It is hoped that an equally successful exhibit may be arranged in this coming year. The Committee is also organizing a display of investment castings, method of production and raw materials in conjunction with Birmingham University in June, 1961.

Lectures and Teaching Aids

The Committee have been very successful in their efforts to present lectures on the production and use of investment castings to technical societies. Altogether, ten lectures have been presented by members of the Association during the year under consideration. These talks, which are illustrated by lantern slides and sample castings, have received wide acclamation by the recipients, among them being the various branches and sections of the Institution of Production Engineers, the Institution of Engineering Designers, the Institution of Engineering Inspectors and the Royal Aeronautical Society. Some 1,000 of the leaflets have been issued at these technical society lectures, and arrangements are well under way for a comprehensive programme of lectures to be presented during the coming winter session.

The issue of lecture notes dealing with the investment casting process to lecturers in technical colleges and universities continues. Sets of slides illustrating these notes are also available on loan for a short period and member firms have given technical colleges sample castings for their retention. Accompanying the lecture notes which are sent out, are biliographies listing the publications of major importance on the subject of investment casting. Altogether, over 250 sets of lecture notes and bibliographies have been dispatched to some 180 colleges and universities. The Committee have been continuing their plans during the year for the publication of wall charts. These charts depict pictorially the sequence of operations in the investment casting process and it is intended that they be multi-coloured, well captioned and durable. The cost of printing these charts is, at present, under investigation and it is hoped that it will prove possible to make these available within the next few months.

(Signed on behalf of the committee by Mr. N. Walker, chairman.)

Industrial Health and Safety

The Industrial Health and Safety Committee have met three times during the year under review and a number of projects have been dealt with as follows:—

Atmospheric Dust

The Committee are of the belief that the most-serious health problem in the investment foundry is that of respiratory diseases resulting from the inhalation of air-borne dust. This problem is not peculiar to investment foundries and the matter has been considered in the light of regulations and recommendations applied to other industries with similar problems. There has been some contact with HM Inspectorate of Factories on the subject of the handling and storage of siliceous refractory material. The recommendations of the Factory Inspectorate have been passed to the member of the Association for their attention.

The facilities for dust determination made available by the good offices of the British Steel Castings Research Association have continued to be utilized by member of the Association. The usefulness of such a report cannot be under-estimated providing, as it does, values of dust concentration at various points in the foundry as well as values of quartz concentration in these dust samples. Results so far obtained tend to show that the dust level in the atmosphere of investment foundries is considerably less than the maximum permissible limits recommended by the American Conference of Governmental Industrial Hygienists and adopted by the International Labour Office. A most revealing comment in one such report was to the effect that the dust level in the street atmosphere of the steelworks area of Sheffield was almost three times as high as that of the dressing shop of the foundry concerned. The Committee are of the opinion that all investment foundries should make use of these facilities available from BSCRA. The cumulative results would be helpful in assessing a general picture of the hazard.

Publications that deal with the subject of atmospheric dust and its control and which are recommended to members are as follows:—

(*a*) Annual Report of the Chief Inspector of Factories on Industrial Health, 1959. Published September, 1960, by HMSO. This general review of all industrial hazards shows that in the case of steel foundries, deaths due to pneumoconiosis of the lungs increased from 35 in 1958 to 55 in 1959. These figures can give us no room for complacency. The chapter entitled, "Dusts and their Effects on the Lungs" is of particular interest. Matters covered include the chemical composition of the dust, particle size, dust concentration, length of exposure, etc.

(*b*) Industrial Health, a Survey of the Pottery Industry in Stoke-on-Trent. Published in 1959 by HMSO. The chapter entitled "Pneumoconiosis and Dust Control" is of general interest whilst the chapter on "Process Dust Control" deals with the use of appliances, methods of control, protective clothing, etc.

(*c*) Toxic Substances in Factory Atmospheres, Safety, Health and Welfare. New Series, No. 8, published March, 1960, by HMSO. The booklet briefly mentions methods of minimizing the risk of exposure by exhausting methods, protective clothing, etc. These are followed by

tabulations of permissible concentrations which are based on data formulated by the Committee on Threshold Limits of the American Conference of Governmental Industrial Hygienists and also used for the International Labour Office.

Whilst on the subject of toxic substances, the Committee is aware of the increasing use of isopropyl alcohol in investment foundries due to the development of the shell technique. The attention of members is, therefore, directed to an Industrial Hazards Bulletin on the subject of Isopropyl Alcohol issued by Imperial Chemical Industries, Limited. The same company issued a booklet dealing with the handling of caustic soda and its solutions which would be useful to any company utilizing this substance for cleaning castings. A study of the forementioned publications is considered likely to provide sufficient data for the maintenance of adequate standards of hygiene in investment foundries. In this connection, the Committee are pleased to note that a well-known authority in the industrial health field in the US has offered a paper for presentation at the forthcoming Conference. Mr. G. E. Tubich, who is a doctor of medicine employed by the Department of Health of the State of Michigan, has previously presented an important paper on the subject of hazards in the investment foundry to the American Conference of Governmental Industrial Hygienists.

Spectacles and Goggles

The Committee have also been interested in the provision and availability of protective goggles for melting-furnace personnel where the major hazard is harmful radiation rather than flying particles. It is apparent that injury can be sustained by the retina as a result of prolonged exposure to light waves of high intensity and radiation of the infra-red and ultra-violet types. The Committee, therefore, recommend to members, B.S. 1729:1952 entitled, "Green Protective Spectacles and Screens for Steel Works Operatives." Herein, the use of green glass screens is recommended in preference to cobalt blue glass because of the superiority of the former in respect of filtering infra-red radiation and the lack of chromatic aberration. The Committee is also collecting information from manufacturers and it is planned to test sample protective goggles under works conditions in order that it may recommend certain types for use in the melting operation of investment foundries.

Thumb Injuries

The Committee is disturbed at the incidence of thumb injuries due to the lack of suitably-designed industrial leather gloves. It is considered that the standard of manufacture of such gloves leaves much to be desired and the weakest point is generally at the joint between thumb and forefinger. The help of manufacturers is being enlisted and it is intended to report the findings of the Committee regarding the most suitable type of glove available.

In conclusion, the Committee wish to draw attention to the scope of their work and by the full co-operation of members in its successful accomplishment.

(On behalf of the Committee. R. Taylor, chairman.)

Industry Statistics

The Committee has continued to play its part in the collection of data on the investment casting industry; its capacity and output, materials and processes used and markets served. A second Annual Survey covering the year 1959 was issued during the year. The second survey questionnaire was a slightly modified version of the first and the summary followed as closely as possible the similar survey made in February, 1960. As more precise and direct answers were requested to some of the questions, certain correlations made on the previous occasion became unnecessary. On the other hand, a number of questions which had been asked in the first survey were omitted on this occasion as they were merely repetitive, for example, date of commencement of business in the industry. During the year under review, the Committee devised an additional questionnaire in order to help in determining market trends, entitled "State of the Market." This questionnaire also attempted to establish the effect the work of the Association was having and in which way, the Association could better serve the industry. This supplementary questionnaire was issued only to members for completion whilst the Annual Survey was distributed to both members and non-members. The returns from both questionnaires were handled confidentially by Peat, Marwick, Mitchell & Company and summaries were prepared by them. The summaries were finally issued to all participants on March 15, 1961.

With regard to the Annual Survey, Peat, Marwick & Mitchell reported that it was apparent that the data produced was very representative of the industry, and that in terms of the industry's capacity, a satisfactory response to the questionnaire was made. Each participant will find the Survey of interest in comparison with that of the previous year and also in relation to his own replies. The Committee, however, would like to make some general comments on the results obtained.

Size and Personnel

During 1959, there was no general increase in the production area of the foundries under survey, only one reporting an increase in floor space. There had been a slight increase in personnel, people on administrative and clerical duties making up 13 per cent. of the total, whilst personnel engaged on inspection averaged more than 10 per cent. of the persons employed in the production area.

Capacity and Production Processes

Based on replies to melting capacity questions, it would appear that the potential output of several companies had increased compared with the previous survey returns. The replies to the question on the type of melting equipment used, showed that indirect-arc furnaces were twice as much employed

as the total of all the other types of melting furnaces. Induction-melting furnaces were the second most-used type of installation, whilst vacuum melting appeared to be gaining ground. In the case of pattern material, the overwhelming use of wax was apparent from replies. The use of plastic had gained little ground since the previous survey. The returns with regard to the type of moulds produced showed that the dip-coat technique was still used to the greatest extent. The use of the ceramic-shell technique tended to be on the increase.

An interesting return on the heat treatment of castings prior to despatch showed that an average of 35 per cent. of castings produced were so treated.

Product and Markets

The numbers and values of castings sold in each of the specified weight ranges, indicated as a percentage of total sales, revealed that castings up to 2-lb. in weight still formed the backbone of the industry. The emphasis seemed to be towards heavier castings with more firms taking an interest in this casting range. The relationship between weight range and price revealed in the previous survey was not confirmed on this occasion and it it difficult to draw any firm conclusion at this stage.

Over half of the industry is still interested in the non-ferrous field, and on a percentage/weight basis the production of copper and aluminium-based alloys remained reasonably steady. The returns showed that all foundries were interested in the production of castings in stainless steel, although on a percentage/weight basis, production ranged from 100 to less than 10 per cent. Two firms showed a small proportion of production from nickel-based vacuum-melted stock, otherwise the use of air-melt stock was standard.

With regard to the markets served, the most remarkable increase has been in the motor-vehicle field, having increased fourfold on average, compared with the previous returns. Sales on a percentage basis in the fields of electrical equipment, oil, petroleum and food values were up. On the other hand, the value of sales in the textile-machinery and steam-turbine markets were apparently less than those previously reported. Summing up, out of the 25 categories listed, the majority of foundries were producing parts mainly for aircraft and guided-missile engines, textile machinery, instruments and hydraulic drives and pumps. In response to the question as to the industries offering the best potential, the aircraft and guided-missile engine field again headed the list followed by gas-turbines (other than aircraft) and textile machinery. The volume of investment casting production which has an outlet within the maker's own organization ranged from nil in two-thirds of the foundries to 75 to 100 per cent. in the remaining third.

A point which is worthy of consideration is the reason for rejection of castings. Internal-inspection rejected castings for the following reasons in the order given:—surface defects, internal flaws and dimensional, whereas customer inspection rejected in the following order:—dimensional, surface defects and internal flaws.

Major Problems

Amplification was requested regarding the implications of specific questions and the Committee is pleased to note that the foundries were good enough to complete this portion. A summary of the replies on the general question as to the major problems facing the industry revealed the following data:—(1) The prime need is the use of publicity methods to spread information about investment castings and the education of the designer in the engineering industry. (2) Once interest has been aroused, it is necessary to ensure that the demand can be satisfied and delivery maintained. (3) In order to ensure satisfaction, liaison with the customer is essential and quality standards must be maintained. (4) This necessitates obtaining staff of the requisite quality from a pool of technical personnel which appears non-existent. (5) On the subject of employees, there is the further internal problem of high labour costs. (6) This high processing cost is closely followed by the problem of the high cost of raw materials.

The Committee has not attempted to analyse the results fully but would recommend to all participants that a close study of the report should prove both interesting and rewarding.

State of the Market

The secondary questionnaire was issued on a trial basis to member foundries only in January, 1961, in order to assess the state of the market. The intention is to issue a similar questionnaire at regular intervals so that the up-to-date trends may be determined.

All participants stated that they were experiencing an increased demand for castings, the demand having been noticeable, in the main, for the last six to 12 months. The main reasons advanced for this increase were placed in the following order of importance:—increase in activity in the aircraft and allied industries, increase in activity in general engineering and the effectiveness of sales campaigns.

Delivery periods being currently offered were generally four to six months for new work and two to four months for repeat work, which agreed reasonably well with the majority opinion expressed that 12 weeks was the optimum delivery period.

A précis of replies regarding the activities of the Association showed that the publicity and educational campaigns conducted by the Association were felt to have contributed to an increase in demand. As for future policy, the suggestions covered consolidation along present lines, all embracing membership, education of customers in the use of investment castings, co-operation with steel and alloy makers and finally the issuing of market surveys.

The Committee very much appreciates the last-mentioned reply and wishes to thank those managements who went to so much trouble to complete the questionnaires.

(Signed on behalf of the Committee by W. S. Fowkes, chairman.)

Iron Castings Production

First Quarter, 1961

With the total output of iron castings in the first quarter of 1961 at 1,026,100 tons, against 1,024,700 tons in the previous quarter, the ironfounding industry has made an excellent beginning to 1961, states the Joint Iron Council in its comment on the Iron and Steel Board's production figures for the first quarter of the year. At the end of 1960, ironfoundries were operating at a high level of production, the salient exceptions being those affected by the recession in the automobile industry. Therefore, says the JIC, it is particularly encouraging to note the improvement in this section in the period under review.

Main Sections

The JIC goes on to say that although the output in the automobile iron foundries during the first quarter did not rise to the very high peak of the corresponding period of last year, it should be borne in mind that the improvement in conditions in the automobile industry itself was confined to the latter weeks of the quarter. At the end of the period, this section of ironfounding was operating at close to record rates of production. The consistent flow of orders reaching the engineering trades as a result of the gathering momentum of manufacturing industry's investment programmes is reflected in the engineering section, where output again edged forward in all but marine and some branches of heavy engineering.

The building section, as heavily dependent on public as on industrial investment, increased its output by a significant margin although the output of castings for domestic goods remained unchanged. The contraction of ingot-mould output is explained by the slight easing of the steel industry's rate of production, while the phasing of railway-track construction and improvement work lies behind the increase in the railway equipment section.

The output of the various sections of the industry is shown in Table 1, the statistics relating to both grey and malleable iron castings, and an analysis of district output is given in Table 2.

TABLE 1.—*Output of Iron Castings, by Section*

Section	First quarter, 1961 (thousand tons)	Percentage Change	
		Previous quarter	First quarter 1960
Automobile (including tractors) ..	186·3	+ 2·5	— 7·6
Engineering (*a*)	342·3	+ 0·9	+ 3·7
Building and domestic (*b*) ..	151·0	+ 1·5	+ 0·1
Pressure pipes (*c*) and fittings ..	135·3	— 3·5	— 9·8
Ingot moulds (*d*)	138·2	— 4·5	+ 1·8
Railway equipment	73·0	+ 4·0	+13·2
Total	1,026·1	+ 0·1	—0·7

(*a*) Including machine-tool, textile machinery, electrical, shipbuilding, etc. (*b*) About 1/5 of the total consist of castings for domestic goods, e.g., stoves, cookers, refrigerators, etc. (*c*) Mainly gas and water. (*d*) Mainly for the steel industry.

Labour

The number employed in the ironfounding industry at the end of March, 1961, was 131,800, an increase of 400 over the previous quarter, and 2,300 more than at the end of March, 1960.

TABLE 2.—*Production of Iron Castings, by District*

District	First quarter, 1960 (tons)	First quarter 1961 (tons)
Eastern, South-Eastern (including London), Southern and South-Western	119,610	115,620
Midland	229,540	229,320
North Midland	223,060	203,780
East and West Ridings	94,830	95,460
North Western	97,810	100,100
Northern	110,560	114,550
Scotland and Northern Ireland	91,160	98,650
Wales	66,290	68,710
Total	1,032,860	1,026,130

Allied Ironfounders' New Training Centre

Last week Mr. Alfred Robens opened a new training centre and the industrial laboratories which Allied Ironfounders, Limited, have installed in a group of workshops at Smethwick. The training centre is a pressing need as the technical developments in domestic-heating appliances demand that the salesman, be he either on the staff of Allied or the distributors, is capable of explaining the new techniques in simple English to the ultimate buyer. Mr. Robens told of some of these developments, which were the outcome of close collaboration between the Coal Board and manufacturers of solid-fuel-burning equipment. One was the erection of show houses in a number of localities, wherein the central-heating boiler will be ignited by an electrical gadget, charged with packaged coal and the ash evacuated by conveyor to the dust bin. Thus there would be achieved a system of central heating which could have all the advantages of oil as a fuel and prove cheaper to operate.

It is interesting to note that the courses to be held at the training centre are fully booked up for the next six months. The lecture theatre which has been installed is a model of its kind.

Colour-oxide Plant for Ferro Enamels

A colour-exide plant, capable of producing over 350 tons of ceramic colours a year, has recently been completed at the factory of Ferro Enamels, Limited, Wombourn, Wolverhampton. The building, covering a total floor area of 16,000 sq. ft., incorporates the use of over 2,000 sq. ft. of vitreous-enamelled panelling. The main doors which are in fully-glazed teak framework are set off with side panels in Mirawal a vitreous-enamelled steel bonded to a rigid backing on a continuous strip process. The vestibule has a floor made up of terrazzo panels with an open-tread staircase in steel and teak.

In the colour production department particular attention has been given to materials handling. An overhead conveyor hoist provides both transverse and longitudinal movement, and switching points are incorporated in the trackage for directing materials to specific machines. The company's own engineering division has designed and constructed the calcining furnaces of the movable-hearth type. The laboratory block houses five separate laboratories and the chemical, physical, research and development departments, together with technical offices, a conference room and photographic dark-rooms.

Personal

Mr. J. K. DOWNING has been appointed a director of Vent-Axia, Limited.

Mr. RALPH E. HERINGTON has been appointed a director of the Triplex Foundries group.

Mr. C. E. WRANGHAM has retired from the boards of Davy-Ashmore, Limited, and its subsidiaries.

Mr. C. H. TANNER, chairman of F. W. Berk & Company, Limited, chemical manufacturers, is visiting the United States, returning on June 21.

Allied Ironfounders, Limited, announces that Mr. H. C. WILSON BENNETTS has, by mutual agreement, resigned from the board with effect from May 31.

Mr. J. S. A. BUNTING, formerly joint divisional general manager, has been elected to the board of Associated Electrical Industries (Woolwich), Limited.

Mr. S. W. G. WALKER, who for 10 years has been Midlands regional manager for Radiation (Parkray), Limited, Belper, was the guest of honour at a function at the works on his recent retirement.

Mr. H. C. CHALLINOR, chief engineer of John Lysaght's Scunthorpe Works, Limited, one of the Guest Keen & Nettlefold companies, has been appointed local director to the board of the Lysaght company.

Mr. H. E. ASHFIELD and Mr. C. L. SMITH have been appointed directors of David Brown Tractors, Limited, Meltham, near Huddersfield. Mr. Ashfield becomes director of engineering, and Mr. Smith, director of finance.

Mr. J. METCALFE, head of the engineering department of Northampton College of Technology, has been appointed principal of the North-West Wiltshire College of Further Education at Chippenham, in succession to Mr. J. A. CHAMBERLAIN.

Mr. F. M. HOPKINS, manager of the costs and wages department of R. W. Crabtree & Sons, Limited, Water Lane, Leeds, has been appointed a director of the subsidiary company, Campbells & Hunter, Limited, Dolphin Foundry, Leeds.

Mr. A. A. ROUND, assistant general manager of the chemical products division, Dunlop Rubber Company, Limited, has been re-elected chairman of the technical panel of the British Rubber and Resin Adhesive Manufacturers' Association.

Mr. NIGEL T. RADCLIFFE, sales director of the catering equipment division of Allied Ironfounders, Limited, has been appointed a director of the Falkirk Iron Company, Limited, and of Allied Ironfounders (Stainless Steel Products), Limited.

Mr. B. W. PAYNE (late director and general manager of Glow-Worm Boilers, Limited, Milford, near Derby) has been appointed director and general manager of Lane & Girvan (1961), Limited, Caledonia Works, Bonnybridge, Stirlingshire, Scotland.

Alderman J. W. STERLAND was installed as Lord Mayor of Sheffield on May 24. At the official luncheon he was presented with the gold medal of the General and Municipal Workers' Union, of which he had been a local official for 25 years.

Mr. C. J. SHEARER, assistant managing director of Alexander Findlay & Company, Limited, bridge builders, Parkneuk Works, Motherwell, has been appointed managing director, and Mr. D. JAGGER (sales manager) and Mr. R. P. HERBERTSON have been elected directors.

Following his recent appointment to the main board of Imperial Chemical Industries, Limited, where he will be mainly engaged in activities overseas, Mr. M. J. S. CLAPHAM has found it necessary to resign from the board of Pyrotenax, Limited. He has been succeeded by Dr. JAMES TAYLOR, director of ICI.

Mr. GEOFFREY CRAVEN, managing director, English Steel Export Corporation, Limited, Sheffield, flew to the British Trade Fair at Moscow on May 24. He had spent a few days at his Sheffield office after returning from a four-week visit to South America, where he had visited Brazil, Uruguay and the Argentine.

Mr. H. MCNEIL, managing director, Babcock & Wilcox, Limited, has been appointed chairman of the Water-Tube Boilermakers' Association in succession to Mr. J. B. WOODESON, chairman, Clarke, Chapman & Company, Limited. Mr. C. J. HOWARD, managing director, John Thompson Water-Tube Boilers, Limited, has been re-appointed vice-chairman.

Mr. K. J. BUSH has been appointed assistant sales manager of the mechanical thermometer division of the Cambridge Instrument Company, Limited, at Friern Park, N. Finchley. Other appointments are of Mr. W. C. ORFORD, Mr. S. V. J. CRUMP and Mr. W. A. HALL as assistant resident engineers at the company's branch offices in Nottingham, Bristol and Manchester, respectively.

Brigadier A. LEVESLEY, O.B.E., M.C., T.D., M.I.MECH.E., a director of Edgar Allen & Company, Limited, who was recently elected senior vice-president of the Sheffield Chamber of Commerce, last week attended, with Mrs. Levesley, the International Chamber of Commerce Congress which was held in Copenhagen. During the Congress, the delegates were received by their Majesties the King and Queen of Denmark.

Dr. D. T. A. TOWNEND, director general of the British Coal Utilisation Research Association, is among those who will receive honorary degrees of Sheffield University at the degree congregation to be held on July 1. He will receive the honorary degree of D.Sc.(Tech.). Dr. Townend was formerly Livesey Professor of Coal and Gas and Fuel Industries at Leeds University and chairman of the advisory committee of the Department of Fuel Technology and Chemical Engineering at Sheffield University.

Following the acquisition of Standard-Triumph International, Limited, by Leyland Motors, Limited, Lancs, it is announced that in order to integrate the operation of the two companies Sir HARRY SPURRIER, Leyland's chairman, has become chairman of Standard-Triumph International, Mr. ALICK S. DICK continues as managing director. Mr. S. MARKLAND, Mr. S. BAYBUTT and Mr. D. G. STOKES have also joined the board. Mr. A. S. Dick and Mr. F. B. DIXON have been invited to join the board of Leyland Motors.

Mr. W. J. ASTON, of the continental department of Samuel Osborn & Company, Limited, Sheffield, has flown to Moscow to work as one of the interpreters on the British Iron and Steel Federation stand at the British Trade Fair. Other interpreters are Mr. R. SEWELL, information officer of the research and development department at Rotherham of United Steel Companies, Limited, and Mr. A. STEEL, of the Workington branch of United Steel. Mr. Sewell went to Russia with the British Steel Delegation five years ago.

Mr. D. W. HAMMOND, works director of Jessop Saville, Limited, Brightside, Sheffield, has retired. In presenting him with a cheque and other gifts, Mr. R. P. Wallace, managing director, said he was responsible for the great technological advances made in the firm since he joined it in 1923. Mr. Hammond started as a metallurgist and became works manager in 1936 and works director 20 years ago. He has been chair-

man of the Jessop Saville Sports Club for more than 30 years and a president of the Sheffield and District Works Sports Association.

The following appointments have been made to the board of the Consolidated Pneumatic Tool Company, Limited, with effect from May 5: Mr. S. H. IRELAND, assistant managing director; Mr. L. S. BRIGHT, financial director, and Mr. A. O. MILLER, director. Mr. Ireland held a general managership with the Birmingham Small Arms group for a number of years. He joined Consolidated Pneumatic in February, 1960, and shortly afterwards spent several months in South Africa on the reorganization of the company's branch at Johannesburg. Mr. Bright has been in the company's service since 1944 and was appointed secretary in 1953. Mr. Miller is a partner in the law firm of White & Case and is at present in charge of their Paris office.

Dr. R. A. SMITH, head of the physics department at the Royal Radar Establishment at Malvern was appointed by the Council of Sheffield University on May 19 to the Chair of Physics at the University, in succession to Professor W. SUCKSMITH who retires next year. Dr. Smith's appointment will date from October 1, 1961. Other appointments made by the Council include those of Mr. R. A. YOUNG as assistant lecturer in chemistry; Mr. A. M. MURRAY, lecturer in physics; and Mr. H. J. BLYTHE, assistant lecturer in physics. The Council received the resignations of the following members of the staff:—Dr. I. D. MACDONALD, assistant lecturer in pure mathematics; Mr. R. D. BREACH, assistant lecturer in applied mathematics; Mr. F. W. G. WARREN, lecturer in applied mathematics; Dr. P. A. MOHR, research fellow in geology; Dr. J. F. WALLACE, senior research fellow in mechanical engineering; and Dr. R. G. WARD, lecturer in metallurgy.

Obituary

Mr. ERNEST PARRAMORE, O.B.E., chairman and joint managing director of Parramore & Sons, Limited, ironfounders, Chapeltown, Sheffield, died suddenly on May 24 whilst on holiday at Bridlington. He was 71. Mr. Parramore was awarded the O.B.E. for his services as chief warden for civil defence in the Penistone Division.

The death has occurred of Mr. F. W. CRANMER, formerly for 30 years north-west district manager of Associated British Machine Tool Makers, Limited. He retired three years ago. He was a former honorary secretary and a past-chairman of the Manchester section of the Institution of Production Engineers and a life member of the Manchester Association of Engineers.

The death is announced of Mr. FREDERICK BUCKLAND PERRY, a director of Robey & Company, Limited. He had been associated with the company for 53 years, and was appointed director on February 22, 1921. Mr. Perry was an eminent engineer, and as a member of the Institution of Mechanical Engineers has read papers before them, and served on the Regional Council. For some years he was a member of various technical committees of the British Standards Institution.

Midland company director, Mr. GUY M. CHANTRY, has died at the age of 68. Chairmanships held by Mr. Chantry included those of Tan Sad Holdings, Limited, Jury Holloware, Limited, Richards Son & Allwin, Limited, Arthur Edge & Company, Harry Rudge, Limited, and the Walsall and District Iron Company, Limited. As chairman of the Birmingham and West Midlands branch of the Institute of Directors for 12 years he built up its membership from 60 to more than 3,000.

News in Brief

STANTON IRON WORKS BAND was second in the Senior Cup competition in the annual Spring Brass-band Festival at Belle Vue, Manchester, on May 13.

GEORGE RICHARDS & COMPANY, LIMITED, a member of the Staveley group, has secured a contract worth £750,000 for the supply of machine-tools to India.

PETERBOROUGH DIE CASTING COMPANY, LIMITED, have opened a new factory and office block in Podholme Road, Peterborough. The factory has an area of 24,000 sq. ft.

THE NEW £650,000 NINE-STOREY BUILDING for physics/mathematics at Sheffield University will be known as the Hicks Building after the University's first vice-chancellor and a Professor of Physics.

THE MIDDLESBROUGH BRANCH of Honeywell Controls, Limited, moved last month from Fletcher Street to new premises at 59/60 Albert Road; the telephone number is unchanged, Middlesbrough 4.43.31 and 4.43.32.

THE VALUATION of the Carron Company's works at Larbert has been increased three times—from £7,106 to £21,416. Among increases in the Larbert area are those of foundries from £1,052 to £5,254 and from £515 to £2,625.

THE LATEST OF THE SERIES of the colour-printed leaflets regularly issued by K & L Steelfounders & Engineers, Limited, Letchworth, tells something of the machining facilities they possess and stresses they are available to their customers.

TWO CONFERENCES IN JUNE are announced by the British Institute of Management. The subject of the first, on June 6 at the Connaught Rooms, London, W.C.2, will be "Operational Research," and the second, on "Work-study," on June 14, will also be held at the Connaught Rooms.

DISPLAYS showing F. W. Berk & Company, Limited's, range of galvanizing fluxes will be seen in the exhibition section forming part of the sixth International Galvanizing Conference at Interlaken from June 4-6. Mr. G. G. Wray and Mr. E. Thatcher will be attending the Conference for F. W. Berk.

AMONG THE MANY BODIES with whom the Distillers Company, Limited, are co-operating during the Commonwealth Training Week are Councils in Barry (S. Wales), Clackmannan County Education Authority (Scotland), Hull and East Riding County Education Authorities, and Liverpool Technical College.

A CARGO MOTOR-VESSEL of 12,000 tons d.w. has been ordered from the Caledon Shipbuilding & Engineering Company, Limited, Dundee, by E. G. Thomson (Shipping), Limited, Edinburgh, an associated company of Ben Line Steamers. The new vessel will be 465-ft. long and will be equipped with an outsize derrick for heavy lift work.

W. H. BAXTER, LIMITED, manufacturers of stone-breaking equipment, Leeds, has received an order worth £10,000 for two portable stone-crushing and screening machines for the Argentine. The order was placed by Senor Isaac Affioni, Minister for Roads and Transport in the Argentinian provincial Government of Neu Quen, whilst in this country.

THE HALL CORPORATION OF CANADA have ordered a 10,000-ton self-unloading ship from William Hamilton

News in Brief

& Company, Limited, Port Glasgow. The vessel is for the same fleet as the Leecliffe Hall, a 25,000-ton bulk carrier launched recently by the Fairfield Shipbuilding & Engineering Company, Limited, Glasgow. Both firms are members of the Lithgow group.

THE FIRST BATCH of 50 excavators ordered last October by the Polish Government from Priestman Bros. Limited, of Hull, are on their way to Poland. Other substantial contracts received by the company during the last three months include an Austrian order to the value of £100,000, and a Swedish conract for excavators for roadmaking and building for £30,000.

A CONTRACT worth more than £66,000 for the supply and installation of a mechanized ash-handling plant at the Kearsley Power Station of the Central Electricity Generating Board has been secured by Bennis Combustion, Limited. The plant will replace an old monorail bucket system. It will quench and convey the ash from 16 water-tube boilers to a 350-ton capacity reinforced concrete bunker.

A TRAVELLING EXHIBITION, arranged by the North Eastern Gas Board to show the new uses for gas, latest appliances and improved methods of installation and operation, is being held this week (May 31 to June1) at the Astoria Ballroom, Leeds. Other centres to be visited include Wakefield, York, Harrogatè, Huddersfield, Bradford, Scarborough, and a return visit to Leeds. Admission is by ticket which can be obtained from the commercial manager of the Board, Bridge Street, Leeds 2.

Mr. ALAN SMART, managing director of the Electro-Chemical Engineering Company, Limited, of Woking; Mr. J. H. Gifford, director, and Mr. L. S. Lowery, Midland area manager, welcomed some 300 guests on May 16 and 17 following the formal opening of the company's new premises in Moor Lane, Witton, Birmingham. The company, a subsidiary of Efco Furnace Company, Limited, is a specialist concern in electro-plating processes and plant. The new premises cover 10,000 sq. ft. of floor space.

AN EXHIBITION of the crafts of "Little Sheffield" will be held in connection with a revival of "The Little Sheffield Feast" which is to be staged at St. Mary's Community Centre, Bramall Lane, Sheffield, this month. A number of firms in the vicinity are to provide materials for the exhibition. Little Sheffield was a village after The Moor had been traversed from Sheffield and the Feast is thought to have originated in the Middle Ages. The area is now part of St. Mary's parish. It was a centre of many small craftsmen's premises.

THIRTY-FIVE MEMBERS of the British Compressed Air Society on a two-day visit to Cornwall were guests of the Holman Group, Camborne, last month. Met by Mr. J. F. Holman (managing director), the party visited the Group's test and experimental mine, Museum and apprentice school before returning to the head office at Roswarne for lunch. The party then visited the heavy machine-shop, percussive tool works and heat-treatment section. The tour was concluded with a brief visit to the new engineering block of the Cornwall Technical College.

THE MYSTERY why a storeman had fallen to his death from a crane at the moulding shop of Sherwood Foundry, Nottingham Road, Mansfield, was unsolved at a Mansfield inquest, and a verdict of "Misadventure" was returned on Mr. Roy King, aged 24. When last seen he had been climbing into an overhead travelling crane. He was found lying on the soft sand floor with severe head injuries. Mr. John Ivan Taylor, director and secretary of the firm, said that King had had no training on driving the crane and was not authorised to go into the cab.

ENGLISH STEEL CORPORATION, LIMITED, Sheffield, has placed contracts worth £1,500,000 with Braithwaite & Company (Structural), Limited, Leatherhead, Surrey, and Alex. Findlay & Company, Limited, Motherwell, for the structural steelwork for the Corporation's new works at Tinsley Park, Sheffield. The contract with Findlay & Company covers the steel required for the melting shop and blooming and billet mills, and that with the Braithwaite Company covers the steel for the bar mills. Steel erection is planned to begin in November and be completed in July next year.

IT WAS A NIGHT OUT for the "old 'uns" at the second annual reunion of former employees of William Shaw & Company, Limited, at Shaw's Middlesbrough foundry on May 17. Of the 47 men present two were 89 years old and seven were between the ages of 85 and 88; their combined ages reached a total of 3,523 years. The party was conveyed in taxis to Shaw's Club for a four-course dinner followed by entertainment. Amongst those present at the celebrations were Mr. Geoffrey Shaw, the Club president who is deputy chairman of the company, Air Commodore Findlay Crerar, managing director, and Mr. J. B. Walker, company secretary.

COCKBURNS, LIMITED, Glasgow valve manufacturers, have received from Italy an order valued at £500,000 for valve and control equipment which will result in at least 60 new jobs at their works. Mr. J. Tinneveld, technical director of the company, said: "We have had some big contracts lately, but this is the biggest since 1948." The equipment is for one of the major contractors in Italy who build oil refineries and chemical factories. Preliminary work on the new contract will start in about 10 weeks' time. Delivery dates will be staggered over 1962 and the beginning of 1963. Shipments of the parts may be made from Glasgow docks.

THE AMERICAN FOUNDRYMEN'S SOCIETY last month started its publicity campaign for the AFS 66th Annual Castings Congress and Exhibition by the issue of an attractive three-colour brochure to foundry equipment manufacturers and suppliers. More than 16,000 foundrymen from all over the world are expected to attend the Show which is being held in conjunction with the 29th International Foundry Congress in Cobo Hall, Detroit, Michigan, from May 7 to 11, 1962. Further information may be obtained from Mr. Dick Hewitt, Convention and Exhibit Manager, American Foundrymen's Society, Golf and Wolf Road, Des Plaines, Illinois, USA.

UNDER A LONG-TERM MARKETING and manufacturing agreement between International Computers and Tabulators, Limited, 149, Park Lane, London, W.1, and the National Data Processing Corporation of Dallas, Texas, U.S.A., the latter company's products will shortly be added to the ICT range of equipment. National Data Processing Corporation manufacture document-handling equipment, initially designed for bank automation, and optical character recognition equipment and ICT specialize in punched-card and electronic-computer data-processing equipment. The introduction of NDP products as peripheral equipment, into appropriate data-processing installations will greatly increase the scope for automated systems embracing electronic-computer techniques.

Raw Material Markets

Iron and Steel

Production of the foundry grades of pig-iron is more than adequate for current requirements. The low-phosphorus irons are in heavy request, the several furnaces producing this grade supplying substantial tonnages to the engineering and speciality foundries, which are also consuming appreciable quantities of hematite, and some refined iron. The light, jobbing, and textile foundries and some of the engineering foundries are taking up overall reasonably good quantities of high-phosphorus iron.

Producers of pig-iron generally would welcome increased sales, as in many instances fairly good stocks are held, and these are being added to from current outputs, which are not being fully taken up.

Substantial outputs of castings are being obtained by the iron foundries and none is better employed comparatively than those supplying high-quality castings to the motor-vehicle trade. The recent recession in this trade appears to have been overcome, and the works are now specifying freely for castings, enabling the engineering and speciality foundries to maintain a full normal working week, although demands are still well below those which obtained during the boom period. From the machine-tool trade, which is now very busy, electrical plant manufacturers, steelworks, heavy engineering trades, agricultural implement makers, and others come substantial overall demands for castings, and the foundries supplying them are well occupied.

Most of the light foundries are only moderately occupied, although those supplying castings to the building trades continue to receive good support. The jobbing foundries are reasonably well employed, but could undertake more work, and the textile foundries are also in need of more orders.

Supplies of scrap are generally sufficient to meet consumption requirements, although arisings of heavy cast iron and machinery scrap are short of overall demands.

The ample capacity of the billet mills is more than sufficient to supply the current requirements of re-rollers of light steel products. The general position is that new orders received now for almost any finished steel product can be fitted in for delivery by the end of the present quarter, and if new orders are not flowing more freely in another week or two, a slowing down of the output of crude steel would appear to be inevitable.

Non-ferrous Metals

Three-months copper price touched £250 per ton last week and, although it has fallen back from this level, indications are that the price will be edging upwards again. At present the copper market is under the influence of the wildcat strike at the El Teniente mine in Chile. Should the strike be prolonged it would quickly react on the New York Market which is not too well supplied with metal. The strike of stevedores at the Chilean ports had also added its bullish influence to the London copper quotations.

Meanwhile, the New York market is steady to strong and the intake price for scrap has been pushed up 1½ cents to 27⅞ cents a pound, equivalent to over 33 cents a pound for refined metal three months hence. This is the basis of the belief that the US custom smelters will raise their price in the near future from its present level of 31 cents a pound. In fact July metal is being traded at over 32 cents a pound. The recent reversal of the price trend, particularly in the United States, has led to a certain reluctance on the part of many consumers to enter the market and the price is probably more sensitive to fluctuations than it appears.

Tin has been under the influence of the International Tin Council meeting as it was hoped that the usual communiqué would provide a clue as to future policy with regard to the tonnage the buffer stock manager should have to "control" the price. However, the communiqué was described as "inconclusive" and made no impact on the market. On the other hand, the fact that arrangements were made for another meeting in a month's time suggests that negotiations are continuing for relief supplies.

The London market has been relatively steady but there has been resistance to the price going higher than its present level for cash metal of around £870 a ton. Singapore continues a good market and so does New York, where the price has risen to over $1.11 a pound.

Lead in London is still a seller's market and the price has eased to its lowest level for two years at £65 a ton. The US market is quiet and the price is unchanged at 11 cents a pound. Zinc in London has shown some improvement in sympathy with copper but the price refuses to budge far from £82 a ton. The US market is fair, but supplies are ample and the quotation is unaltered at 11½ cents a pound.

Recent Wills

SINDLE, J. W. W., former secretary and a director of the Chesterfield Tube Company, Limited £12,731

BONNER, ALBERT, a director of the Phoenix Iron Works Company, Limited, Littleborough (Lancs) £40,549

TOZER, ALBERT, of Morecombe, founder of Haugh Shaw Brass Foundry, Limited £1,868

LIVERSIDGE, BERNARD, retired metallurgist, former member of the staff of Thos. W. Ward, Limited, Sheffield £10,344

ALLDAY, G. W., for more than 50 years a member of Heeley & Peart, Limited, malleable ironfounders, of Newport (Mon) £83,553

CRONSHAW, C. J. T., former director of Imperial Chemical Industries, Limited, the Manchester Ship Canal Company, etc. £70,718

BROWN, G. A., chairman and managing director of George Brown & Company (Marine), Limited, shipbuilders, of Greenock £47,536

AGUTTER, A. W. V., a director of Centaur Tool Works, branch of Coventry Machine Tool Works, Limited, and president of the British Association of Machine Tool Merchants in 1954 ... ... £8,821

THORNYCROFT, SIR JOHN EDWARD, chairman and governing director of John I. Thornycroft & Company, Limited, marine engineers and shipbuilders, and a former president of the Institute of Civil Engineers, the Institute of Naval Architects, and the Institution of Mechanical Engineers £77,870

BROWN, JOHN, former general secretary of the Iron and Steel Trades Confederation £722

LYNAM, T. R., director and general manager of the Oughtibridge Silica Firebrick Company, Limited, Sheffield £9,277

ASTON, J. H., first managing director of Tube Investments, Limited, and a leading member of the steel tube industry £174,343

BURNAGE, F. P., formerly chairman of Charles Churchill & Company, Limited, machinery and tool merchants, of Birmingham £100,266

CARMICHAEL, J. D., chairman of Carmichael Bros., Limited, ironfounders, of South Shields (Co. Durham) and chairman of the North of England Ironfounders' Association £11,335

WILLSON, HORACE, president of William Hamilton & Company, Limited, Glasgow shipbuilders, and its former chairman and managing director, and a past president of the Shipbuilding Employers' Federation £29,078

BUCKLEY & TAYLOR, LIMITED, of Oldham, a member of the Brightside group, Sheffield, has received an order for a water-distillation plant to be installed in a B.P. tanker. The plant will be capable of producing 25 tons of fresh water daily from seawater.

Current Prices of Iron, Steel, and Non-ferrous Metals

(*Basis prices, delivered unless otherwise stated*)

May 31, 1961

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2, 10-ton lots or over Middlesbrough, £21 17s. 0d.; Birmingham, £21 9s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.40 per cent. P 10-ton lots or over, £23 5s. 0d., delivered Birmingham £23 10s. 0d., delivered Grangemouth.

Cylinder and Refined Irons.—North Zone, £25 6s. 6d. South Zone, £25 9s. 0d.

Refined Malleable.—P, 0.10 per cent. max.; North Zone £26 6s. 6d.; South Zone, £26 9s. 0d.

Hematite.—Si less than 2 per cent, S. & P. over 0.03 to 0.05 per cent., 10-ton lots or over; N.-E. of England (local iron), £23 19s. 0d.; Scotland (Scotch iron), Zone S.1, £24 5s. 6d.; Sheffield, £25 9s. 0d.; Birmingham, £25 13s. 0d.; Wales (Welsh iron), £23 19s. 0d.

Basic Pig-iron.—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leicestershire in 10-ton lots or over.

FERRO-ALLOYS

(*per ton unless otherwise stated, delivered*)

Ferro-Silicon (6-ton lots and over).—45 per cent. Si. £45 0s. 0d. to £48 0s. 0d., scale 15s. 0d. per unit, lumpy. 75 per cent. Si, £62 0s. 0d. to £66 10s. 0d., scale 15s. 0d. per unit, lumpy.

Ferro-vanadium.—50/60 per cent., 22s. 6d. per lb. of V.

Ferro-molybdenum.—65/70 per cent., carbon-free, 12s.10d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

Ferro-tungsten.—80/85 per cent., 9s. 11d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 12s. 11d. per lb. of W.

Ferro-chrome (6-ton lots and over, lumpy).—4/6 per cent. C, £81 10s. 0d. to £84 10s. 0d., basis 60 per cent. Cr scale 27s. 0d. to 28s. 6d. per unit; over 6 per cent. C, £79 0s. 0d. to £82 10s. 0d., basis 60 per cent. Cr, scale, 27s. 0d. to 28s. 6d. per unit; 2 per cent. C,* 1s. 8d. to 1s. 11d. per lb. Cr; 1 per cent. C,* 1s. 8d. to 1s. 11½d. per lb. Cr; 0.15 per cent. C,* 1s. 9½d. to 2s. 0½d. per lb. Cr; 0.10 per cent. C,* 1s. 9½d to 2s. 0½d. per lb. Cr; 0.06 per cent. C,* 1s. 11d. to 2s. 1d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 6s. 10d. per lb.

Metallic Manganese.—94/96 per cent., carbon-free £275 0s. 0d.; 96/98 per cent., £285 0s.0d.

Ferro-columbium.—65/67 per cent. Cb + Ta, 19s. 0d. per lb., Cb + Ta.

Ferro-manganese (Standard).—78 per cent., £58 10s. 0d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft u.t., 100 tons and over, £31 15s. 6d.; tested, 0.08 to 0.33 per cent. C, 100 tons and over, £32 5s. 6d.; hard (0.41 to 0.60 per cent. C), 50 tons and over, £33 17s. 0d.; silico-manganese, 50 tons and over, £42 16s. 6d.; free-cutting, 50 tons and over, £35 4s. 6d. SIEMENS MARTIN ACID (50 tons and over): Up to 0.25 per cent. C, £40 11s. 0d.; silico-manganese, £43 4 s. 0d

Billets, Blooms, and Slabs for Forging and for Stamping (50 tons and over).—BASIC: Soft, up to 0.33 per cent. C, £37 0s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C, £38 2s. 6d.; acid, up to 0.25 per cent. C, £41 14s. 0d.

FINISHED STEEL

Heavy Plates and Sections (50 tons and over).—Ship plate (N.-E. Coast), £40 7s. 0d.; boiler plates (N.-E. Coast), £42 17s. 0d.; floor plates (N.-E. Coast), £41 16s. 0d.; angles (N.-E. Coast), £38 1s. 6d.; joists (N.-E. Coast), £37 17s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., and flats 5 in. wide and under, untested soft basic, 50 tons and over, £39 1s. 0d.; under 10 tons to 4 tons, £40 18s. 6d.; under 4 tons to 2 tons, £41 3s. 6d.; hoop and strip, coils, 100 tons and over, £38 0s. 0d.; uncoated strip mill coils, hot rolled, under 3 mm. to 12g., 25 tons to under 50 tons, £43 16s. 0d.; black sheets (hand mill), 24g., 10 tons and over, £57 14s. 6d.; galvanized corrugated sheets, 24g., 10 tons and over, £67 11s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £66 7s. 0d.; nickel-chrome, £97 1s. 0d.; nickel-chrome-molybdenum, £109 14s. 0d., in lots of 25 tons and over.

NON-FERROUS METALS

Copper.—Cash, £240 0s. 0d. to £240 5s. 0d.; three months, £242 5s. 0d. to £242 15s. 0d.; settlement, £240 5s. 0d.

Copper, Tubes, etc.—Solid-drawn tubes, 2s. 4¾d. per lb.; rods, 265s. 0d. per cwt. basis; 20 s.w.g., 300s. 0d. per cwt.

Tin.—Cash, £869 10s. 0d. to £870 0s. 0d.; three months £875 0s. 0d. to £875 10s. 0d.; settlement, £870 0s. 0d.

Lead (Refined Pig).—Second half May, £64 5s. 0d. to £64 7s. 6d.; second half August, £66 0s. 0d. to £66 5s. 0d.; settlement, £64 17s. 6d.

Zinc.—Second half May, £81 15s. 0d. to £82 0s. 0d.; second half August, £82 5s. 0d. to £82 10s. 0d.; settlement, £82 0s. 0d.

Zinc Sheets, etc.—Sheets, 15g. and thicker, all English destinations, £119 15s. 0d.; rolled zinc (boiler plates), all English destinations, £117 10s. 0d.; zinc oxide (Red Seal); d/d buyers' premises, £97 10s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 1s. 11¾d. per lb.; sheets to 10 w.g., 213s. 3d. per cwt.; wire, 2s. 9¾d.; rolled metal, 213s. 3d. per cwt.

Brass (Brazing).—BS1400, B3, £185; B6, £233.

Brass (High Tensile).—BS1400, HTB1, £203; HTB2 £221; HTB3, £240.

Gunmetal.—BS1400, LG2, £231; LG3, £241; G1, ½%, £305; G1, 1%, £295.

Phosphor Bronze.—BS1400, PB1 (AID released), £323 BS1400, 90/10/1, £311.

Leaded Phosphor Bronze.—BS1400, LPB1, £254.

Phosphor Bronze Strip, etc.—Strip, 312s. 0d. per cwt. wire, 4s. 3¾d. per lb.; rods, 3s. 6¾d.; tubes, 3s. 6¾d.; chill cast bars, solids 3s. 6¼d.; cored 3s. 7¼d. (CHARLES CLIFFORD LIMITED).

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 11¾d. per lb.; round wire, 10g. in coils (10 per cent.), 4s. 4¾d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 3¾d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 2¾d. to 2s. 3d. per lb.; Antimony, English, 99 per cent., £230 0s. 0d. Quicksilver, ex-warehouse, £67 0s. 0d. Nickel, £600 0s. 0d. Aluminium, ingots, £186 0s. 0d.; aluminium bronze (BS1400), AB1, £257; AB2, £265.

* Average 68-70 per cent.

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Company News

THOMAS MARSHALL & COMPANY (LOXLEY), LIMITED, manufacturers of fireclay refractories, of Sheffield—Net profit for the year ended December 31, 1960, is £129,549 (£115,520) after tax of £96,992 (£88,104). Ordinary share dividend for the year is 15 per cent. and for deferred shares 1.66 per cent.

PEGLERS, LIMITED, brassfounders, etc., of Doncaster (Yorks)—Dividend for the year ended March 31, 1961, is being raised to 18½ (16½) per cent. Net profit is £349,339 (£344,350) after tax of £343,236 (£329,000). In addition, net profit, after tax, of subsidiaries attributable to Pegiers, amounted to £5,283 (£16,183 loss).

BRITISH THERMOSTAT COMPANY, LIMITED—In addition to maintaining the final dividend at 9d. per 5s. ordinary share, the company is adding a bonus of 4½d. per share to make 1s. 4½d. for the year ended January 31, 1961, against 1s. per share. After tax the group net profit is £512,632 (£396,581). There is added a profit of £4,984 on the sale of property.

CASTROL, LIMITED (formerly C. C. Wakefield & Company, Limited), makers of lubrication oils and appliances, of London, N.W.1—Dividend for 1960 is raised to 2s. (1s. 10d. equivalent) per 10s. stock unit, with a final of 1s. 4½d. Group sales throughout the world in 1960 surpassed the previous year's record, directors state. Profits, after all charges, including tax, amounted to £1,721,209 (£1,834,813).

TRIPLEX FOUNDRY, LIMITED, ironfounders, manufacturers of ranges and grates of Tipton (Staffs)—Group profits rose to £290,453 (£181,152) in the year ended March 31, 1961, and the dividend is increased 2½ per cent. to 15 per cent., on a capital slightly more than doubled by a rights issue and acquisitions, with a 10 per cent. final. After tax of £131,764 (£75,766) net profit is £158,698 (£105,376).

GLACIER METAL COMPANY, LIMITED, manufacturers of plain bearings, die-castings, etc., of Wembley (Middx)—Final dividend of 10 per cent. is being paid on the capital increased by a one-for-four rights issue. This makes, with the 5 per cent. interim on the former capital, a total of 15 per cent. for the year to February 28, 1961, against a single payment of 13 per cent. Group net profit increased to £237,454 (£159,795) after tax of £187,181 (£98,899).

BRITISH STEEL CONSTRUCTION (BIRMINGHAM), LIMITED—In his review of the accounts to September 3, 1960, the chairman states that trade of the Canadian subsidiary is showing some revival after a period of recession, but he expects a further loss in the current year of some £25,000. Last year the figure was £116,000. Preliminary figures for the group for the first six months of the current year indicate a net loss, but there are prospects of a small overall profit for the whole year.

RECOMMENDATION by the directors of Head, Wrightson & Company, Limited, engineers, iron and steel founders, etc., of a final dividend of 12 per cent. brings the total for the year to January 31, 1961, to 16 (14) per cent. Although the group trading surplus was higher at £1,714,412 (£1,686,250) and depreciation was the same at £254,409, a heavier tax charge of £672,873 (£628,580) brought the net profit down to £787,130 (£803,758).

In addition there was a profit of £108,378 on the sale of a subsidiary company to Laporte Industries, Limited, which has been transferred directly to capital reserve.

Law Cases

Foundry Regulations Unfulfilled

Despite advice and the fact that five years had elapsed since the Iron & Steel Foundries Regulations had come into force, a Bristol firm had not taken practical steps to comply with them, Mr. J. N. Pyburn, H.M. Factories Inspector, told Staple Hill Magistrates on May 11.

The firm, Bush & Wilton, Limited, The Old Foundry, Golden Valley Lane, Bitton, pleaded guilty to three summonses and were fined a total of £50. They admitted summonses of failing to keep posted a copy of the Iron & Steel Foundries Regulations, 1953; failing to provide effective and suitable local exhaust ventilation or other suitable means of suppressing dust at a pedestal-grinding machine; and failing to provide adequate facilities for taking showers or other baths. Mr. Pyburn said that there had been publicity when the Regulations came into force and in spite of promises in letters, defendants were unable to provide any detailed proposals when the proceedings were brought.

Mr. J. Littler, defending, said the firm had never before been prosecuted and had an excellent accident record. In 1956 the Factories Inspector drew attention to various matters and, with the capital available at the time, the recommendations were put into practice. It was true that in 1956 the firm was warned of the necessity of providing shower-baths but the cost would have been about £1,000 which was not available at the time. Proper plans had now been prepared providing for substantial expansion and the necessary work would be put into hand with a minimum of delay.

IN AN ACTION FOR PERSONAL INJURIES at Leeds Assizes Mr. Cyril Reginald Weightman, 69, was awarded £350 damages and costs in settlement against the West Yorkshire Foundries, Limited, of Sayners Lane, Hunslet, Leeds. Mr. Weightman broke a leg while employed by the company in 1958.

Metals and Alloys Reorganization

Metals and Alloys (Birmingham), Limited, announce the following changes in the executive structure of the company and its associate company, Metallurgical Refiners, Limited. Mr. P. D. Liddiard, B.SC., F.R.I.C., F.I.M., has been appointed managing director of the two companies. He joined the staff in 1955 as technical general manager and was shortly afterwards appointed to the board. He will continue to retain the direct responsibility for the technical development of the products and processes of the two companies.

Mr. A. F. Bushell, M.S.M.A., who joined Metals & Alloys (Birmingham), Limited, two years ago as sales manager (cast products) has now been appointed sales manager covering the sales activities of all products. This company now undertakes the selling of the combined products of the two companies. Other appointments are of Mr. F. Howitt, as technical manager, Mr. N. E. Edwards, sales office manager, Mr. P. Robinson, production manager (powder products), and Mr. A. Smith, production manager (cast products).

LANE & GIRVAN (1961), LIMITED—Mr. E. C. Marsland has been appointed chairman. Mr. B. W. Payne, A.M.I.E.E., general manager, and Mr. D. McMillan, C.A., have also joined the board.

New Patents

(Copies of complete specifications are obtainable from the Patent Office, Sales Branch, 25, Southampton Buildings, Chancery Lane, London, W.C.2, price 3s. 6d.)

841,714. Foundry Services, Limited, Long Acre, Nechells, Birmingham, 7.

A process for the production of exothermic linings for hot tops, risers and the like. The vertical internal surfaces only of the hot top or riser are sprayed with a coating of a composition which contains a binder (such as aqueous sodium silicate, set by the action of CO_2) and a powdered or granulated material. These ingredients react together exothermically. The binder agent may, however, be dissolved in a solvent, and thus set by evaporation.

841,873/4. N. Herzmark, Villa la Rustica, Clarens-Montreux, Switzerland.

A method of manufacturing a jointless shell mould for investment casting of metals. In Patent **841,874** the inventor claims a method for the manufacture of precision-casting moulds, in which the binders used are organic silica sols. These are prepared by silica hydrosols obtained from water-soluble mineral silicates. A change of liquid medium is effected in the presence of an organic solvent by osmosis, or by physical separation in the presence of a salt formed by osmosis.

841,891. Regie Nationale des Usines Renault, 8-10 Avenue Emile Zola, Billancourt, Seine, France.

A method of protecting the surfaces of metallic moulds. Before the moulds are used, a number of coatings are applied by projection in molten form from a blow-pipe or gun. The first coating consists of an alloy containing at least 15 per cent. chromium. The subsequent coating consists of a cermet containing 50 to 90 per cent. of alumina and 10-50 per cent. of a metal component containing 70 to 100 per cent. chromium.

842,054. Heinrich and Reinhard Koch, Sprockhovel, Westphalia, Germany.

A process for manufacturing sand moulds or cores containing waterglass as a binding agent. Carbon dioxide is then applied as a hardening agent. An organic indicator (such as litmus or the Merck Universal Reagent) capable of visibly responding to the carbon dioxide is applied at the mouth of the exit hole (provided for the emergence of the gas) in an already shaped mould or core. The quantity of CO_2 added can thus be accurately controlled.

842,095. Elektro-Thermit, G.m.b.H., 125, Gerlingstrasse, Essen, Germany.

Apparatus and method for welding workpieces, more particularly rails, by the alumino-thermic intermediate casting process. It is a special claim of the invention that the workpiece ends are pre-heated by flames projected from above, down the "head" section of the mould which consists of a refractory material and which is prefabricated at some convenient locality other than *in situ*. (See also abstract of BP **836,496,** FOUNDRY TRADE JOURNAL, March 16, 1961.)

842,358. Mannesmann A.G., Mannesmannufer 1b, Düsseldorf, Germany.

A continuous-casting plant which includes at least one vertically-arranged mould, and a device for guiding the casting.

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Book Reviews

Cobalt: Chemistry, Metallurgy and Uses. Edited by Roland S. Young. Published by Chapman & Hall, Limited, 37, Essex Street, London, W.C.2; price £6 1s. 9d. post free.

This is the 149th monograph produced under the auspices of the American Chemical Society, and replaces an earlier edition entitled "Cobalt." The dust-cover indicates that its purpose is directed to chemists working with cobalt and chemists or metallurgists wishing to add to their general knowledge. This statement may be misleading. The pages relating to metallurgy or physical properties number 137 in all, those of chemistry 119, and the general issues 91. Such a book may be said to be directed at both chemists and metallurgists, and it is indeed a reference of competence, with a pleasant style and a very full bibliography.

Commencing with historical and general information on cobalt, the extraction of the metal is covered descriptively but concisely. Chemical and physical properties are combined in a single chapter, but a separate chapter on magnetic, electrical and electronic applications is included. A long chapter on co-ordination compounds will be of interest only to chemists, whereas the one on phase-diagrams will be invaluable to metallurgists. These phase-diagrams are well presented, clearly printed, and simple to read; allotropy has received due care and attention.

The metallurgical applications of cobalt are grouped under high-temperature service, tool steels, cemented carbides and electroplating. The first of these is easily the best, and presents a most useful description of Stellite alloys. Inevitably there is some overlapping between these chapters, but no unnecessary repetition of information could be detected by the reviewer.

Bearing the chemist in mind, the uses of cobalt in glass and ceramics, and as a catalyst, are rightly included, but the metallurgist, also, will find the former of some interest. The final chapters deal with biology and biochemistry, radioactive cobalt, and analytical methods for estimation of the metal. Author and subject indexes appear at the end.

The book will be of interest not only to research workers using cobalt but also to those developing engineering materials for high-temperature service, for cutting tools or for wear resistance. The price is high, but this is almost a foregone conclusion in this present decade. The uses and development of this metal have received more attention in the USA than in the UK, a situation which this book may help to change.

C. R. TOTTLE.

Giesserei - Lexikon (Foundry Encyclopaedia) (in German). Edited by A. Schulenburg and published by Fachverlag Schiele & Schöne GmbH, 11, Markgrafenstrasse, Berlin, S.W.61 Germany; price DM 68 (approx. £6 4s., including postage).

A second edition of this work has been published only two years after the appearance of the first edition. The new work includes over 6,000 entries arranged on 800 pages with more than 150 tables and 800 illustrations. Also included is a directory of suppliers of foundry products and of foundry requirements.

Considerable efforts have been made to keep this volume up to date and it includes references to literature up to early 1960. This means that such exotic elements as mendelevium are included but there is no reference to hot-corebox practice. The length of individual articles naturally varies considerably with the importance of the subject and ranges from one line to several pages. On the whole, the entries are well written and the information presented is reliable. The diagrams are all clear, but the photographs and the illustrations of microstructures are not always of the same high quality.

When faced with a massive volume of this type, one wonders to whom it is most likely to appeal. The practising foundryman is likely to find the accent on any individual operation insufficiently detailed for his specialized needs and it is not often that he requires merely a summary of superficial information on any subject. The young student and inexperienced foundryman may find such a volume very helpful when faced for the first time with some new problems, but people in this position would be deterred by the relatively high price. Its usefulness in England is severely limited by the fact that it is entirely in German and is written for the German user. Practically the whole of the literary references are to German sources which, in many cases, are based on work done in other countries.

M. M. HALLETT.

Publications Received

BCIRA Broadsheet No. 4. Published by the British Cast Iron Research Association, Alvechurch, Birmingham.

This *Broadsheet* covers the subject of "The Relationship between Composition, Strength and Structure (or hardness) of Grey Cast Iron." It is an excellent account of the influence of the carbon equivalent on the major properties of cast iron and if placed in the hands of an intelligent foundry foreman should enable him to co-operate with the metallurgist to the benefit of their firm. The account is expanded to take in the influence of section thickness and, finally, it covers the relationship between machinability, composition and structure. In short the article provides the connecting link between theory and practice and is thereby a very valuable document.

Export Guide, Vol. V, No. 2. Issued by the Economic and Marketing Research Unit of the General Electric Company, Limited, Magnet House, Kingsway, London, W.C.2.

The general outlook for British exports as set out in great detail in this publication differs little from the previous issue, except that Ceylon is labelled "bad." The main article "Help and Self Help in Exports," is designed to help the medium-size industrial firm having problems in entering overseas markets. It is a plain, straightforward story which neither minimizes the difficulties nor exaggerates the simplicity of the operations. It is a well-balanced assessment of the situation. A second article discusses the potentialities of the Japanese market.

Annual Report, 1960. Published by the British Iron and Steel Research Association, 11, Park Lane, London, W.1.

The British Iron and Steel Research Association, which now has an annual income rapidly approaching £1,000,000 a year, undertakes much research of ancillary interest to the foundry industry. In the report, progress made by the steelmaking and metallurgy divisions and the chemistry and physics departments is dealt with, and information is also given as to reports published by the Association, and the personnel and functions of the various committees and panels.

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Imports and Exports of Iron and Steel in March

The following tables, based on Board of Trade returns, give figures of imports and exports of iron and steel in March this year. Totals for the first three months of 1960 and 1961 are also included.

Total Exports of Iron and Steel

Destination.	Month ended Mar. 31.	Three months ended March 31.	
	1961.	1960.	1961.
	Tons.	Tons.	Tons.
Malta	954	2,186	1,518
Sierra Leone	435	1,245	4,064
Ghana	2,089	5,915	4,792
Nigeria	6,907	17,418	22,629
Union of South Africa	5,424	18,017	18,179
South-West Africa	1,036	1,296	5,265
Rhodesia and Nyasaland	4,532	5,620	10,956
Tanganyika	3,115	2,384	7,055
Kenya	4,093	4,947	11,139
Uganda	1,135	421	1,624
Mauritius	135	1,183	526
Bahrein, Qatar, and Trucial States	2,226	4,951	4,678
Kuwait	2,233	1,394	4,530
India	15,630	70,861	65,807
Pakistan	3,172	19,621	10,094
Singapore	2,011	4,331	6,502
Malaya	3,581	4,624	8,196
Ceylon	3,714	14,992	8,481
British North Borneo	302	1,282	838
Hongkong	5,649	18,001	16,076
Australia	14,451	41,704	52,431
New Zealand	24,894	24,557	80,518
Canada	6,949	55,367	29,288
Jamaica	1,774	7,378	5,350
Trinidad	1,975	11,899	9,081
British Guiana	785	1,916	2,243
Other Commonwealth countries	3,317	7,023	7,429
Eire	5,693	15,696	19,475
Soviet Union	1,928	7,206	7,393
Finland	6,131	9,028	13,828
Sweden	13,083	56,927	45,101
Norway	10,822	35,654	30,778
Denmark	7,654	26,961	24,067
Poland	1,184	3,279	3,704
Western Germany	7,314	49,051	23,631
Eastern Germany	2,778	8,848	6,088
Netherlands	12,472	37,938	31,464
Belgium	3,641	10,241	7,114
France	607	2,245	2,181
Switzerland	1,243	3,096	4,608
Portugal	2,060	3,914	6,184
Spain	1,643	9,101	4,774
Italy	6,887	12,202	17,012
Austria	511	1,350	1,488
Yugoslavia	6,457	5,565	11,550
Greece	2,568	4,087	10,794
Turkey	910	976	4,833
Netherlands Antilles	105	1,558	279
Portuguese East Africa	572	1,076	932
Egypt	6,904	6,180	12,020
Libya	800	2,084	2,305
Sudan	649	3,028	2,666
Israel	2,005	6,653	6,258
Saudi Arabia	84	148	313
Iraq	3,848	7,695	18,157
Iran	1,639	26,008	5,160
Burma	593	2,532	1,402
Thailand	556	2,359	1,757
Indonesia	320	7,970	2,084
China	2,118	17,386	7,790
Japan	9,024	27,431	30,901
Philippine Republic	163	2,604	1,059
USA	10,998	87,359	25,362
Cuba	159	2,542	650
Mexico	837	1,999	1,267
Colombia	976	2,710	3,970
Venezuela	3,049	11,881	5,888
Ecuador	188	600	781
Peru	206	1,902	1,619
Chile	411	651	1,059
Brazil	1,341	5,499	3,097
Uruguay	1,144	2,937	2,615
Argentina	10,785	26,702	27,768
Other foreign countries	4,877	20,602	19,645
TOTAL	282,455	933,994	862,160

STONE-PLATT INDUSTRIES, LIMITED—Mr. R. T. Pemberton has been appointed to the board.

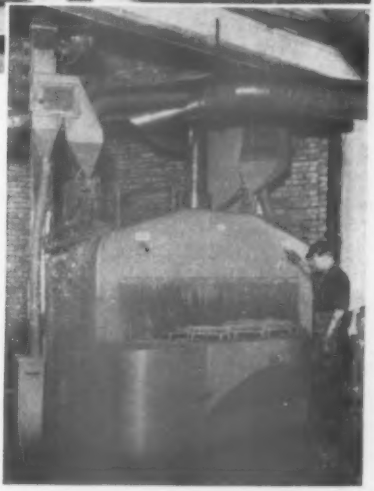
Total Imports of Iron and Steel

From	Month ended March 31.	Three months ended March 31.	
	1961.	1960.	1961.
	Tons.	Tons.	Tons.
Union of South Africa	2,497	12,968	8,907
Rhodesia and Nyasaland	5,637	1,920	13,714
Canada	14,134	7,232	50,699
Other Commonwealth countries and Eire	633	9,726	10,903
Soviet Union	2,025	12,871	6,819
Sweden	4,829	11,802	14,394
Norway	9,830	33,427	32,188
Poland	197	6,620	418
Western Germany	2,902	43,802	11,108
Netherlands	12,697	44,494	27,783
Belgium	5,530	21,237	16,527
Luxembourg	2,856	2,938	8,848
France	1,879	15,099	7,510
Italy	17	4,027	225
Austria	826	3,318	1,633
Japan	663	1,967	2,391
USA	1,498	28,020	4,319
Other foreign countries	800	7,937	2,632
TOTAL	69,510	269,405	221,018
Iron and steel scrap and waste fit only for the recovery of metal	3,542	42,154	6,831

Exports of Iron and Steel by Product

Product.	Month ended March 31.	Three months ended March 31.	
	1961.	1960.	1961.
	Tons.	Tons.	Tons.
Pig-iron	6,037	58,695	23,364
Ferro-columbium (niobium)	1	40	8
Ferro-tungsten	77	323	252
Other ferro-alloys	248	2,443	964
Ingots, blooms, billets, slabs, sheet bars (incl. tinplate bars), and similar primary forms	3,944	17,795	8,367
Pieces roughly shaped by forging	239	476	579
Iron bars, rods, angles, shapes, and sections	233	434	606
Steel bars, rods, angles, sections, and shapes	63,734	167,733	185,746
Iron plates and sheets	288	304	515
Universal plates	1,274	5,540	3,308
Steel plate, 3 mm. and under 4.5 mm. thickness	4,015	8,981	9,689
Ditto, 4.5 mm. or more in thickness	26,541	92,749	85,429
Blacksheets and blackplate	30,541	82,900	86,676
Hoop and strip	12,797	25,520	34,719
Tinplate	36,710	147,585	114,136
Decorated tinplate	732	1,056	1,894
Galvanized sheets	6,731	18,249	19,739
Other (incl. tinned sheets, terneplate, and ternesheets)	3,329	8,857	10,131
Railway and tramway construction material	18,712	37,360	61,193
Wire rods of steel (incl. alloy steel)	3,480	16,606	13,257
Wire	11,527	32,634	34,828
Tubes, pipes, and fittings	51,265	208,714	166,760
TOTAL	282,455	933,994	862,160

SIMONS-LOBNITZ, LIMITED, Renfrew, have secured, against strong foreign competition, an order to build a dredger for the Board of Management of the Port of Rangoon. The machinery for the vessel will also be British made.



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SITUATIONS WANTED

WORKS ENGINEER (41), experienced all aspects installation, maintenance, development of mechanised foundries with modern techniques, requires new appointment. Good background and qualifications. Salary required £2,000. Box WE790, FOUNDRY TRADE JOURNAL.

FOUNDRY DIRECTOR (37), A.I.M., M.I.B.F., with present company 12 years, desires change. Experience covers all aspects iron and non-ferrous castings production. Salary required £2,000. Box FD768, FOUNDRY TRADE JOURNAL.

FOUNDRY FOREMAN, 30 years foundry industry. Experienced in loam, drysand, greensand moulding, and CO_2 process. Able to train labour and direct operations in mechanised and hand methods, in production of high quality grey iron castings. Box FF786, FOUNDRY TRADE JOURNAL.

FOUNDRYMAN, 48, high technical and wide practical experience in Engineering, m/c tools, hydraulics, light castings, domestic appliances etc., and foundry/works/general management, seeks senior executive position. Accustomed sole control. Midlands preferred. Box FF783, FOUNDRY TRADE JOURNAL.

REPRESENTATIVE, experienced, with well-known Midlands company producing malleable castings, desires change. Confidential replies to Box RE784, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT

APPLICATIONS are invited for the position of FOUNDRY FOREMAN to take charge of a small Grey Iron and Brass Foundry which is part of a large Engineering Company in the West Riding of Yorkshire. Applicants to have had previous experience in the running of a foundry and to be fully conversant with all labour conditions, and to be capable of achieving output on a piece-work basis.

Replies in strictest confidence, please state age, experience, qualifications and salary required to: MANAGING DIRECTOR, P.O. Box AA771, FOUNDRY TRADE JOURNAL.

CATTON & COMPANY LTD. require a FETTLING SHOP SUPERINTENDENT to take charge of their cutting, fettling and allied processes. Applicants should have steel dressing shop experience, together with ability to control labour and production costs. This is a Senior Staff appointment and will carry pension benefits. Assistance with housing will be provided, if required. Replies, which will be treated in confidence, and which should give full details of age and experience to date, to: TECHNICAL DIRECTOR, CATTON & CO. LTD., 29, Chadwick Street, Leeds 10.

CHIEF METALLURGIST required to take control of melting plant in Iron and Steel Foundry producing over 250 tons of steel per week. Preference will be given to applicants having experience of hotblast cupola operation and the manufacture of steel by tropenas converters. Apply Box CM773, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*contd.*

MSL have been retained to advise on this appointment

FOUNDRY SUPERINTENDENT

for a major engineering group of long standing which continues to improve its volume of business in heavy plant and machinery in the home and export markets.

He will be responsible for managing the iron and steel foundries, which it is the company's intention to modernise and develop, with a combined force of 500 producing medium castings for competitive sale both within the group and to outside users.

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Preferred age 35 to 40. Initial salary around £2,000 with pension and assistance with housing. Please send brief details in confidence quoting reference GT.9212 to J. G. Smith.

In no circumstances will a candidate's identity be disclosed to our client unless he gives permission after a confidential interview at which he will be given full details of the appointment.

MANAGEMENT SELECTION LIMITED
212 West Regent Street, Glasgow C.2

ASSISTANT MANAGER required for small but expanding non-ferrous foundry in Essex producing sand and gravity die castings. Age 24/35 years. Pension Scheme. Excellent opportunity for the right man. Reply stating age, experience and salary required to Box AM782, FOUNDRY TRADE JOURNAL.

ASSISTANT ESTIMATOR (CASTINGS) required for expanding sales department. Excellent prospects for young man with good education and basic engineering knowledge. FOLLSAIN-WYCLIFFE FOUNDRIES LIMITED, Lutterworth, Nr. Rugby.

SALES MANAGER required by blackheart malleable iron foundry. Position offers good salary and prospects. Please give details of experience. Box SM789, FOUNDRY TRADE JOURNAL.

AN expanding Non-ferrous General Foundry in Scotland requires a SUPERINTENDENT with several years' experience of modern foundry technique and some knowledge of metallurgy including casting of Aluminium Bronzes. Knowledge of rate fixing and ability to control labour essential. Good prospects. Write with full details of past experience to Box AE785, FOUNDRY TRADE JOURNAL.

WOLVERHAMPTON METAL CO. LTD.

Require a young and experienced representative for the sale of ingots in the Greater London area. Please write in strict confidence stating full particulars of age, experience etc. to: "Director," 64, George Street, London, W.1.

MOULDING MACHINE Manufacturers invite applications from Representatives or foundry executives interested in selling in Yorkshire or Durham. Apply in first place to Box MM769, FOUNDRY TRADE JOURNAL.

FOREMAN required to take charge of a small Grey Iron Jobbing Foundry, producing castings for the Machine Tool trade. Applicants must be between 35-45 years of age. Strong disciplinarian, drive and initiative essential. TEAGUE & CREW LTD., Steam Mills, Cinderford, Glos.

SITUATIONS VACANT—*contd.*

TECHNICAL SALES REPRESENTATIVE required for South Wales and South-West England. General foundry experience and good personality essential. Generous salary and expenses paid. Apply with full details of experience to HARBOROUGH CONSTRUCTION COMPANY LIMITED, Foundry Supplies Division, Market Harborough.

COMMISSION available to REPRESENTATIVES introducing work to medium sized Non-Ferrous Foundry in London. Capacity for all types of Sand and Gravity Die work in aluminium and specification bronzes, etc. Write in strict confidence to Box CA781, FOUNDRY TRADE JOURNAL.

BUSINESS OPPORTUNITIES

COMPANY specialising in the supply of foundry plant, equipment and sundries, offers share opening with a view to eventual 50 per cent. participation. Company is old established and known throughout the British Isles and with numerous outlets overseas. Turnover shows progressive increase. Box BO779, FOUNDRY TRADE JOURNAL.

SUCCESSFUL IRONFOUNDRY with excessive orders for high quality castings is interested in manufacturing arrangement with a foundry in the Birmingham area, having capacity and/or facilities for expansion. Box SI787, FOUNDRY TRADE JOURNAL.

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WANTED.—Air Squeeze Moulding Machine, suitable for 80 lbs./sq. inch pressure, fitted with hand or air operated pin lift and table dimensions 36 in. × 24 in. Box WA780, FOUNDRY TRADE JOURNAL.

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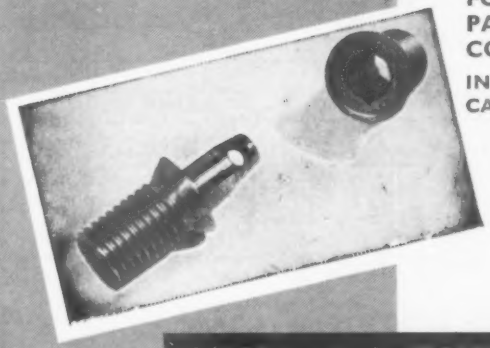

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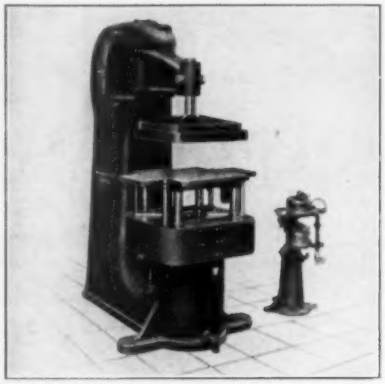

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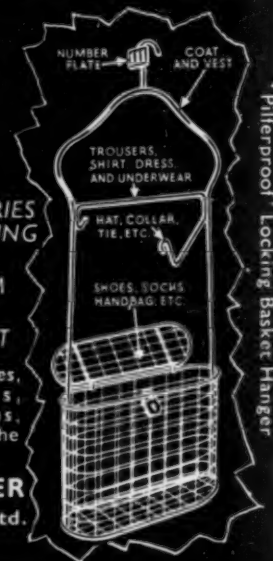

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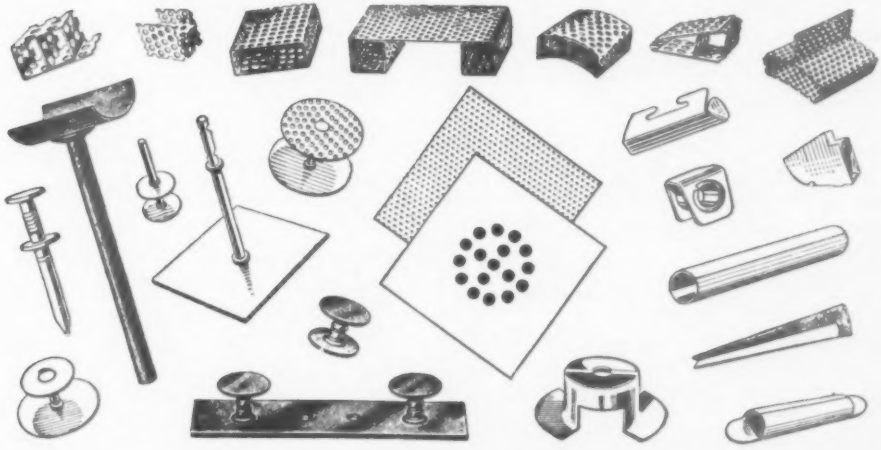

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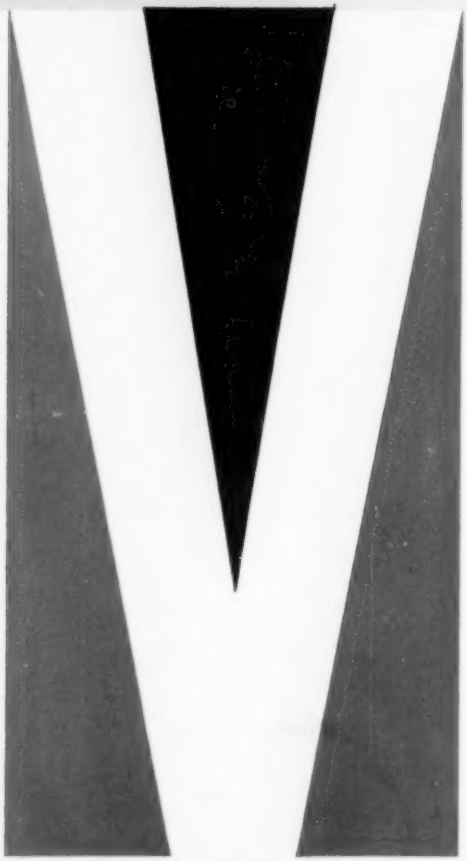

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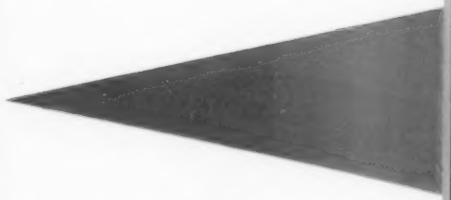

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